It's Up to Congress

THE important fact of vital interest to business men is that Congress is in Extraordinary Session.

What everyone in America wants to know is how long is this Roosevelt depression going to last?

As we see it, the answer is, until Congress realizes that the Roosevelt depression is a deadly reality and then repeals or drastically modifies the punitive taxes upon business, revises the Wagner Labor Act along workable lines, and finally puts an end to all such cock-eyed legislation as the Agricultural Bill, which is before it at present, and the wage and hours controversy known as the Black-Connery Bill.

All of this is rightly within the constitutional powers of Congress—they alone can do it and should do it. From no other source can the necessary confidence-producing action come.

The business people—and that term includes every man or woman, who has invested in a store, factory, foundry or what-have-you, or who is working in any producing line for a living—have lost all confidence in the New Deal as a means to restore prosperity to this country.

They will have no more of it and their protests are being registered daily, not in letters or telegrams to their representatives in Congress, but in the recessions of daily business transactions.

One commentator says that an irate constituent wired his Congressman to this effect: "What are you doing down there? Why don't you do something? Stop the hell-bent trend of busines." Typically American, of course, but it does emphasize one immediate necessity and that is that Congress *must* quit its dilly-dally, vaporizing and get down to the brass tacks of saving the country by saving the country's business.

The recession has been the most precipitate in history. In three months, we have lost three years' gain of business volume. We are back to a 64.5 per cent of normal business volume, having rapidly slid away from a high point of 81 per cent. Nothing did it but the final collapse of all confidence in the political panaceas propounded by the New Dealers.

What is needed is men at Washington who recognize the gravity of the situation and can see the unmistakable registered evidence of the immediate need of a right-about-face.

The precipitate decline can be turned into victory advance provided Congress will furnish the leadership. If it doesn't, the recession will continue and then, the only hope will be to elect men to Congress at the general elections scheduled for next fall who know how to serve the people. It is a long wait fraught with deadly consequences to every citizen, but it is the penalty which must be paid for being so foolish as to fall for the vagaries of the New Deal.

Pray that Congress shall not fail now of its opportunity to save us.

EDITORIAL

With the holiday season marking the end of another year, The Paper Industry extends to its readers, advertisers and friends its very best wishes for a Merry Christmas and a Happy New Year.

The Public and Paper

RECENTLY two gentlemen were seated together on a commuters train, homeward bound after a day of work from one of the country's metropolitan cities. Not long out of the station, a conversation was struck up between them. One was of the inquisitive and listening type; the other of the informative.

Although the questions asked by the inquisitive and inquiring individual were not clearly audible, the informer spoke in tones that could not but be overheard by anyone seated nearby.

He spoke of the sulphite process, of unbleached and bleached pulps, of the sulphate industry and of the rapidly expanding industry in the South. Casually, it seemed that here was an individual perhaps associated in some way with the pulp and paper industry or, at least, a layman who was better informed on the nature of processes involved in the making of pulp and paper than is commonly the case in the ordinary run of contacts in the big city. Never was there a moment of indecision. Information just flowed from his lips. He was enthusiastic and commented interestingly.

What a publicist he seemed to be for the industry. He was doing a good selling job—selling the industry to his inquirer and the inquirer was absorbing his every comment.

Then a boomerang! He touched upon the species of wood employed for chemical pulp production. He said that poplar was the most widely used species because of its long fibers; that southern pine was now being used quite extensively but that its fiber was short. Had he been as conversant with the industry as it first was supposed, could he have been so ignorant of the comparative fiber lengths of poplar and of pine; and of the relative importance of poplar as compared to the other wood species used by the industry? It hardly seems so.

The industry needs publicity. The layman is interested in learning about it. He should be informed and informed accurately. Certainly there must be some way to give him this information.

Why not do something about it?

Improved Mill Sanitation

GREAT care has been exercised in the design of many, if not all, of the new pulp and paper mills to equip them with modern sanitary conveniences. All of this equipment has been installed with the one idea of convenience both from the standpoint of location and use. There are well-arranged locker and wash rooms, excellent toilet facilities, and drinking fountains that supply good water at all times at a palatable temperature.

The locker facilities permit the safe keeping of wearing apparel dispensed with by the individual employe while on the job and of the employe's overalls or other work clothing while off duty. They also give to each employe a sense of security for personal effects and allow each of them to be dressed properly for the job and as attractively as personal tastes dictate in going to and from work. They likewise make for a tidier mill as such items as they contain might otherwise be stored at innumerable places out in the open throughout the mill.

Adequate washing facilities, frequently in the same rooms as the lockers or in rooms immediately adjoining, allow the individual employee to clean up before going off duty or previous to eating.

Toilet facilities, likewise, often adjoin the locker and wash rooms or are more widely scattered. In the latter case, additional washing facilities commonly are provided.

Drinking fountains with the water cooled by electricity are even more widely scattered. Frequently, there is a fountain very convenient to each comparatively small group of workers. Such positioning of a fountain makes it unnecessary for any worker to travel any distance for a drink and tends to keep the worker on the job at greatest personal efficiency.

Without doubt many of the older mills are just as adequately equipped with sanitary conveniences as the new ones; but it is believed that there are a number of them in which such facilities could be improved materially.

Look into the situation in your mill. Possibly it already is properly provided with such conveniences, but, if not, arrange to make it so.

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1938 PAPER
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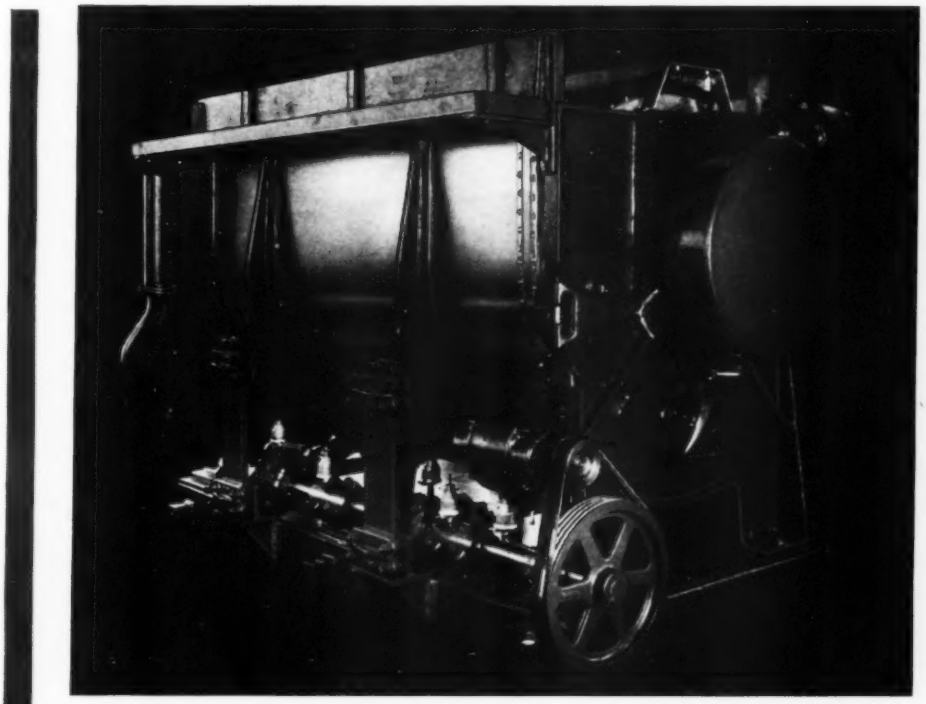
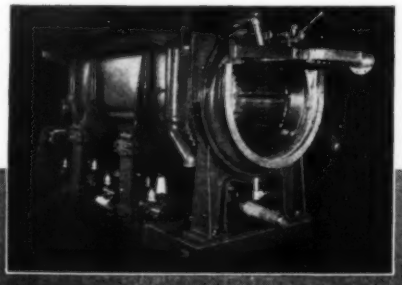


Why be content to struggle along with outdated, outworn screens that constantly menace quality, quantity and economy of production?. . . The New Bird Screen has the capacity and efficiency of screening action to employ the finest possible screen slots for your grade. Far cleaner paper with far fewer seconds and rejects is assured. The screen pays for itself out of the savings in operation and maintenance. . . . Let us tell you how little the replacement costs.



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New Frontiers

WILLIAM SIBLEY

IF YOU haven't read it, let me suggest that you get a copy of *Man in a Chemical World* (A. Cressy Morrison—Scribners—$3.00). Paper making is nothing short of applied chemistry, so that the subject is not entirely strange. But Morrison does the remarkable job of putting the science of chemistry into the layman's language and making a very technical science live, breathe and have its being in human interest. Reading that book, as I have very recently, I couldn't help thinking of the vast frontiers yet open to the man with initiative. Frontiers far wider than those which confronted the Pilgrim Fathers, Fulton, Edison, or James J. Hill. Those people had physical frontiers to invade and claim as their own. The frontiers of today are scientific, and being so are infinitely wider, broader and deeper.

In his book, Mr. Morrison says very little about the future potentials for the chemical industry. He merely brings the reader up to date; gives him a better appreciation of its far-reaching effects in many industries. But the imaginative mind cannot help but leap beyond the covers of the book and see endless vistas of possibilities. Shaving creams, for instance. I get so darned tired of shaving the same face every day! Some times I think the monotony of the morning shave would be broken if I had some other face to shave! But more often I offer up a little bathroom prayer that very shortly some chemist will perfect a new and acceptable depilatory, one which will have an unobtrusive, yet rather delightful fragrance —one which will be virtually a skin food rather than something which would harm the tender epidermis— and one which might be applied like face cream, then washed from the face, leaving—presto—a face not only entirely free of hair but entirely devoid of beard stubble. A face as soft as a baby's. Believe me, the chemical engineer who can develop such a boon to mankind will learn the truth of the mouse-trap legend and leave this vale of tears and beards a multi-millionaire. And I will gladly aid him to riches and fame.

Such are the new frontiers facing the young man of today. Frontiers with possibilities ten and more lucrative and easy of access than the frontiers conquered by Daniel Boone or Daniel Webster or Daniel Willard. If your boy, or any boy under your influence, is lacking in determination as to "what to be when he gets to be a man," show him a faint glimmering of the possibilities contained in chemistry.

. . . Or electricity. My word! What worlds there are yet to be invaded in the field of electricity. The transmission of heat and power and light by radio. The development of electrical frequencies so minute they may be attuned to individual personalities—the perfection of which would mean that you could have your own tiny broadcasting set in your vest pocket, and could transmit messages on your wife's, your mother's, your brother's individual frequency. This would mean instantaneous communication; the elimination of kidnaping or lost persons; the correction of much crime and countless other benefits too remote to even guess.

Doubtless there will soon be developed electrical appliances which will vastly extend that unknown substance, electricity, into the field of therapy. Chemical and medical science seem impotent to make discoveries for the curing of the common cold. And what we know as the "common cold" is one of the most costly of diseases. Not perhaps in actual lives (although even that is a debatable question), but certainly in commercial profits through lost time and reduced efficiency. Very well then, where medical science depending upon chemistry fails, there might very conceivably be a field for electricity. Let there be immediate advent for the electrical engineer who can develop a simple, certain method for curing, or better still preventing, the common cold.

There exists no field of endeavor, from the making of hair-brushes to the business of national government, that does not afford unnumbered fields for exploration, invasion and vast improvement. Frontiers for the frontiersman are on every side. Never before in all history has there been wider opportunity for the young man with an alert mind. Imagination and initiative have always merited recompense, but never in the degree or to the extent that exists today. Here in America lies the land of opportunity. It is a great and boundless frontier to ambitious youths of almost every nation on the globe. They want nothing so much as to come to America where opportunity abounds. It is often said that the American born youth often lacks appreciation of the opportunities offered in his native land. Let him see his own country as others see it; appreciate it as they do; work with it as they would work with it. The United States *is* the land of opportunity; the land of literally countless frontiers.

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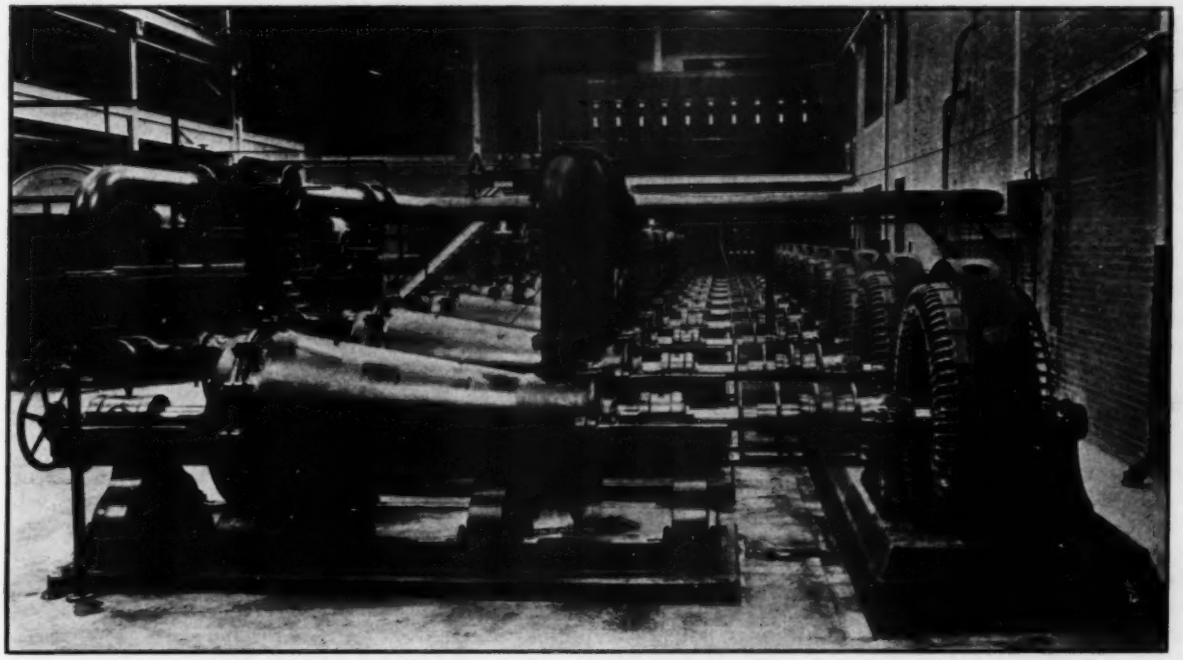


Twelve 350 hp. 400 r.p.m. direct connected synchronous jordan motors showing high voltage automatic cubicle control

Paper Mills Expand Along Definite Lines

R. R. RUGGLES and F. M. ROBERTS
Industrial Department, General Electric Company

NEWSPRINT, once the staple product of many mills in this country, cannot now be manufactured economically in many parts in competition with mills situated in the low cost wood and power areas of Canada. In spite of the migration to Canada of a large part of newsprint production the majority of the old mills still operate, many with increased production.

During the last twenty-five years a great amount of money has been invested in existing U. S. paper mills to enable them to profitably manufacture book, bond, tissue or specialty papers instead of news. The same buildings now house modernized machines and up-to-date power plants operating in parallel with Public Service systems to obtain heat balance with power as a by-product.

When the older mills in the Northern section of this country were built, they were driven by local water-power stations supplemented by steam engines. Water wheels drove lineshafts operating machines, pumps, beaters and jordans; steam engines supplied low pressure steam for drying and gave an approximate heat balance, and there was no interconnection with power sources external to the mill.

It must be remembered that high speed paper machines have only been available within the last fifteen years. Prior to their perfection, machine speeds of 500 to 700 feet per minute were considered high. Boiler pressures were usually 100 to 150 pounds. Backline shaft drives used wooden toothed miter gears and mechanical clutches.

At the time these mills were built and the original equipment installed, the engineers used the best materials that were available and the best methods that were known. Change of product and increase in production have been possible for these old mills because engineering methods and materials have improved so greatly that new limits of speed and output have been established.

This article outlines some of the outstanding en-

gineering changes which have made this development possible.

Boilers

The boiler room is primarily involved in any paper mill expansion, since additional steam will be needed for process work and additional electric power will be required for new and larger machines.

Boiler manufacturers, today, are making boilers for commercial use for pressures far in excess of those common a few years ago, even in one case up to 2500 lb. gauge, and, since such a range of pressures is available, the best pressure to use in the expanded plant becomes an unhampered choice. In recent years economy has been given much consideration, and it is necessary to study the heat balance of the mill considering various steam pressures in order to select the most economical one. The ideal pressure is that which will produce all the electrical power required as a by-product and yet will provide all the steam necessary for the mill processes. The best pressure in paper mill work is usually something under 800 lb., as this has been found in most cases to meet both the power and steam requirements and to provide a heat balance under average conditions.

New high pressure boilers can completely replace the older boilers or can be superposed on the existing system. Figure 1 shows a diagram of an 800-lb. boiler superposed on a 250-lb. system with the turbine of a turbine generator set used as a reducing valve to drop the steam pressure from 800 lb. to 250 lb. This arrangement gives both more power and more steam and yet makes very little change in the existing plant. It is noted that the 250-lb. boilers can be used as an auxiliary to make up for any peaks in steam requirements or can be completely shut down and used only for standby purposes.

Superposing a high pressure boiler and steam turbine on the existing system can usually be done without much trouble, as very little of the old system is disturbed. Where low pressure boilers have been left in for standby purposes, the space occupied by them can later be used for additional higher pressure boilers with higher steaming rates.

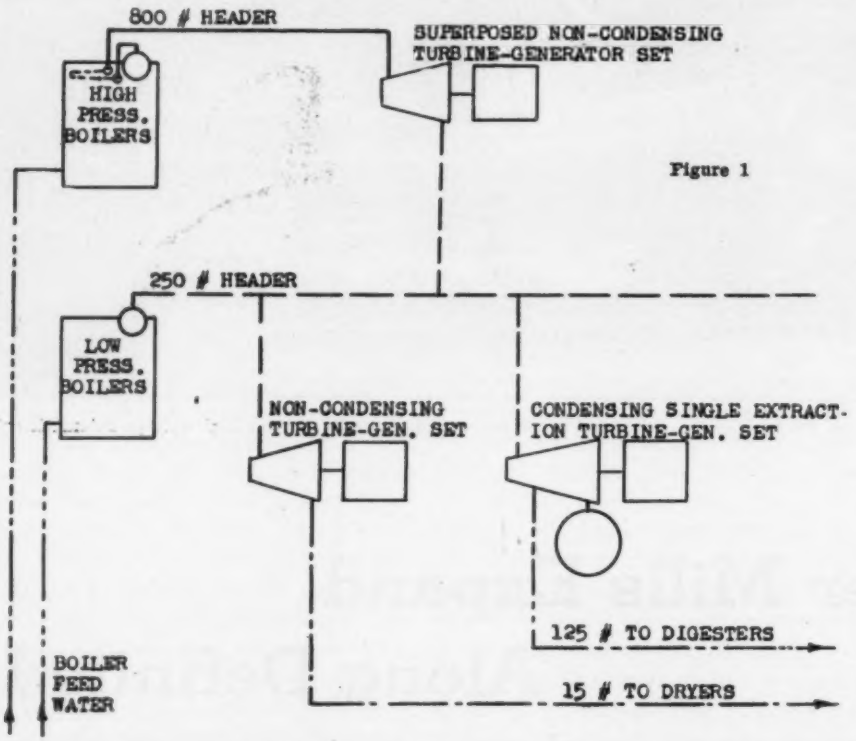


Figure 1

Turbine Generators

The heat balance analysis has determined the steam pressure rating of the boilers and has also brought about the steam conditions for the turbine. The turbine manufacturers have kept pace with the boiler manufacturers so that turbines are available for whatever initial steam conditions may be chosen from the heat balance study.

Paper mills requiring steam for process work at 125 pounds for cooking and 15 to 30 pounds for drying have been provided with condensing double-automatic extraction-turbines which in addition to meeting the steam demands provide the electric power necessary for operating the mill.

Non-condensing turbines are frequently applied where the heat balance analysis indicates that the entire steam flow can be economically used for process work. These turbines are speed controlled through the generators which usually operate in parallel with other

generators, but they can be arranged to automatically throw over to individual speed control in the event of a tie line break between the generators.

Switchgear

All circuit breakers should be checked to see that they meet the short-circuit conditions imposed by the extra generator capacity. An across-the-line dead short-circuit imposes stresses in a breaker that might be several times its rating and only by a careful study can the short-circuit conditions be determined. A short-circuit study of the existing mill power system, together with a similar study of the probable conditions after the expansion has been completed, should be made to determine the proper circuit-breakers to be used.

If it is found that the installed circuit-breakers are incapable of meeting the duty, perhaps reactors can be installed in the line which will reduce the short-circuit conditions to the capacity of the existing breaker. Sometimes it is possible to install new breakers, having higher duty in the space occupied by the old breaker. Usually the old breaker can be safely used somewhere else in the system.

Figure 2 shows a generator and feeder bus sectionalized and using reactors. This can frequently be done without much change in the previously installed switchgear. With proper sectionalizing of the load only a small percentage of the power would pass from one section of the bus to another. There are several modifications of this plan for using reactors and each plant must be studied in order to select the best arrangement.

It has occasionally been found desirable to completely modernize the switchgear, changing from the open type to one of the enclosed types, cubicle or metal clad. Either type is completely factory built. Setting in place and connecting up the leads is about all that is required after it leaves the factory. Changing over to the modern type of switchgear can be done over a week-end, thus minimizing plant shut down.

Increasing the load might tax the feeder cables and the bus structure with attendant excessive voltage drop, thus requiring the installation of larger feeder cables for 240, 480 or 600 volt systems. In order to take care of this higher loading, generator voltages as high as 2400, 4150 or 6900 volts are used and carried to distribution centers where it is stepped down to the low voltages required for motor applications. This arrangement reduces the voltage drop from the point of generation to the point of utilization and avoids interference with the existing low voltage system.

Having provided the additional steam and power required, let us look at the more modern means of using them in the mill.

Grinders

Grinders have in the past been driven by water wheels. In many mills the "head" varies so greatly throughout the year that it is not possible to take full advantage of the stream flow in the spring and in the summer there is often a shortage of water. This condition became critical when an expansion program became desirable in some mills. The problem has been solved in some cases by adding an a-c. synchronous motor-generator to the water wheel grinder lineshaft. In the event of the water available being excessive, this unit will return power to the mill system; if, on the other hand, the water is so low that there is insufficient power for grinding, the a-c. machine acts as a motor and takes power from the mill system to supplement that supplied by the water wheels. Under any condition it acts as a speed governor to hold the grinder lineshaft speed constant. Such an arrangement permits the installation of additional grinders with the same water wheels and makes it unnecessary to disturb the original installation.

Individual Drives

The individual drive provides the plant engineer with one of his best chances of making two machines operate where there was only one before. In those mills where the constant speed units are driven from lineshafts a conservative survey of the space saving by the use of individual drives indicates a probable reduction of 50 per cent in the floor space required. This motor-for-each-machine principle can be used in providing drives for jordans, beaters, pumps and refiners which are more efficient and safer to operate than the group drives and which reduce maintenance.

The same principle of space economy may be applied to chippers or shredders. Usually these machines have been driven by individual motors through belts and pulleys. Today a direct connected synchronous motor may be installed which will require little more space than the old driven pulley. It is possible to put two modern 88 in. chippers in the floor space previously occupied by one belt driven chipper and its drive.

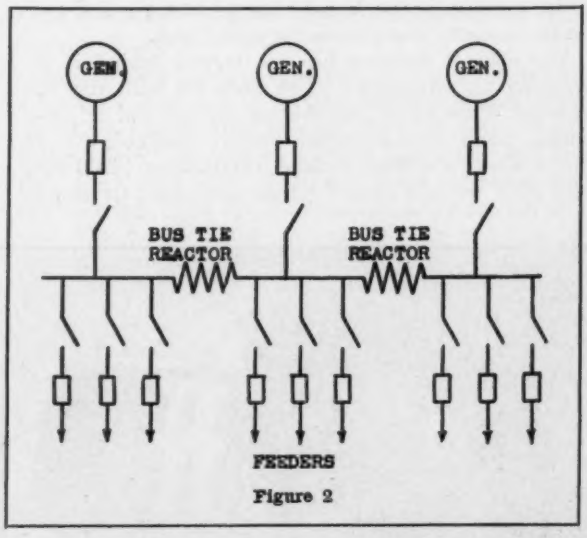


Figure 2

The perfection of the high speed centrifugal pumps driven by direct connected motors in place of the old geared and belt driven reciprocating pumps is a good example of modern space saving. The introduction, too, of complete lines of gear-motors, which enable low driving speeds to be obtained by means of a compact built-in gear on a high speed a-c. or d-c. motor, provided another tool with which the plant engineer could work and made the individual, direct connected drive possible for all plant auxiliaries.

Motors and Control

If there had been no progress in the design of electrical and mechanical equipment for special applications, the expansion and modernization of mills would have been accomplished only with high maintenance costs. The application engineer has insisted upon equipment designed for the service which is to be met. A good example of a design which has partly resulted from the demand for better equipment in the paper mills is the splash-proof induction or synchronous motor.

Before the development of this type of protection the wet mill conditions had to be guarded against as well as possible through the use of home-made shields and covers. Today it is common for mills to standardize on the splash-proof motor construction to guard against dripping water and wetting of motors when "hosing down." These improved motor enclosures, together with the modern motor insulation, designed especially for paper mill conditions, have lengthened motor life and reduced maintenance, making the application of the individual drive possible on all mill auxiliaries.

The synchronous motor of today is a driving unit which modern technique has made available for general purpose applications. The constant speed and unity or leading power factor characteristics of the synchronous motor are most desirable for many applications which have previously been reserved for induction motors because of the required special motor torque characteristics for starting, accelerating or operating. Today synchronous motors are available which will develop the torque required for operating any constant speed paper mill auxiliary. Their application to grinders, beaters, jordans, vacuum pumps and refiners helps to keep plant power factor high so that the full generator capacity is available for useful load.

The control designer has not lagged behind in developing his equipment to be installed with the new motors. Water proof push button stations and drip and splash proof controllers are readily available for all motor sizes. For high voltage installations (2200 volts and over) cubicle control panels have been developed. These controllers are designed to take care of the plant equipment in the event of short circuit when power is obtained wholly or partly from a high capacity power system; they are splash or drip proof and to facilitate installation they are completely wired up at the factory.

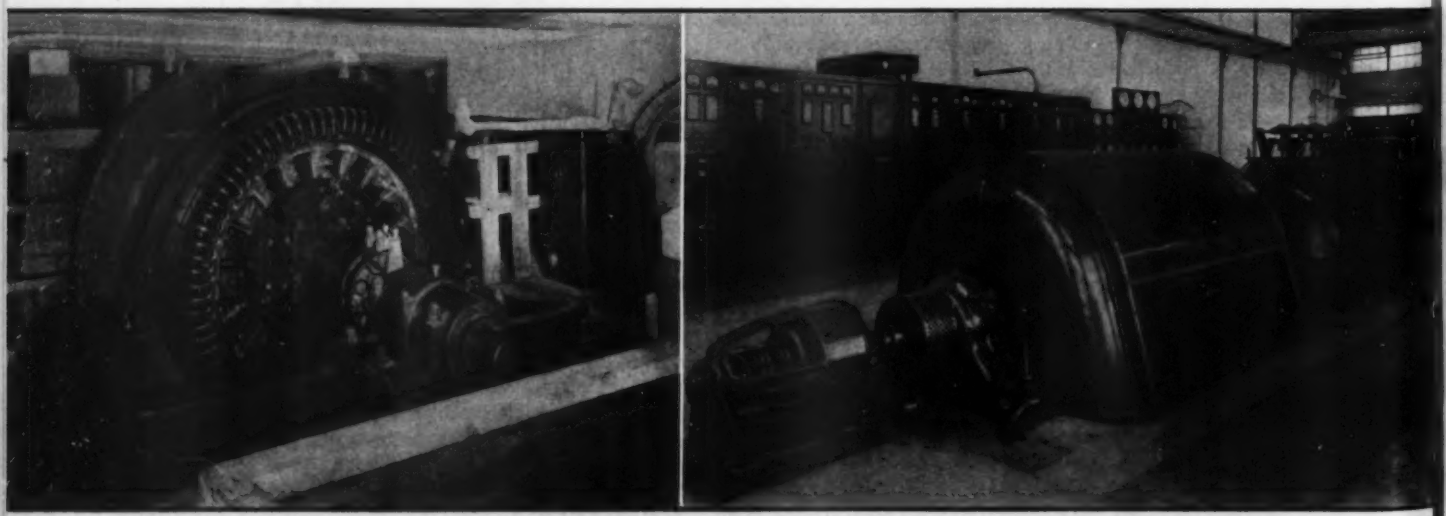
The Paper Machine

The casual observer may think that the paper machine of today is pretty much the same as its predecessor of a few years ago—nothing is farther from the truth, however. The modern machine operates at *twice the speed with less power, less steam,* and less maintenance per pound of paper and makes a better product and often a new product. In most cases ball or roller bearings are used on today's machine. If a backline shaft is used, it probably has hypoid gears and magnetic clutches. Roll lifts and felt stretchers are sure to be motorized.

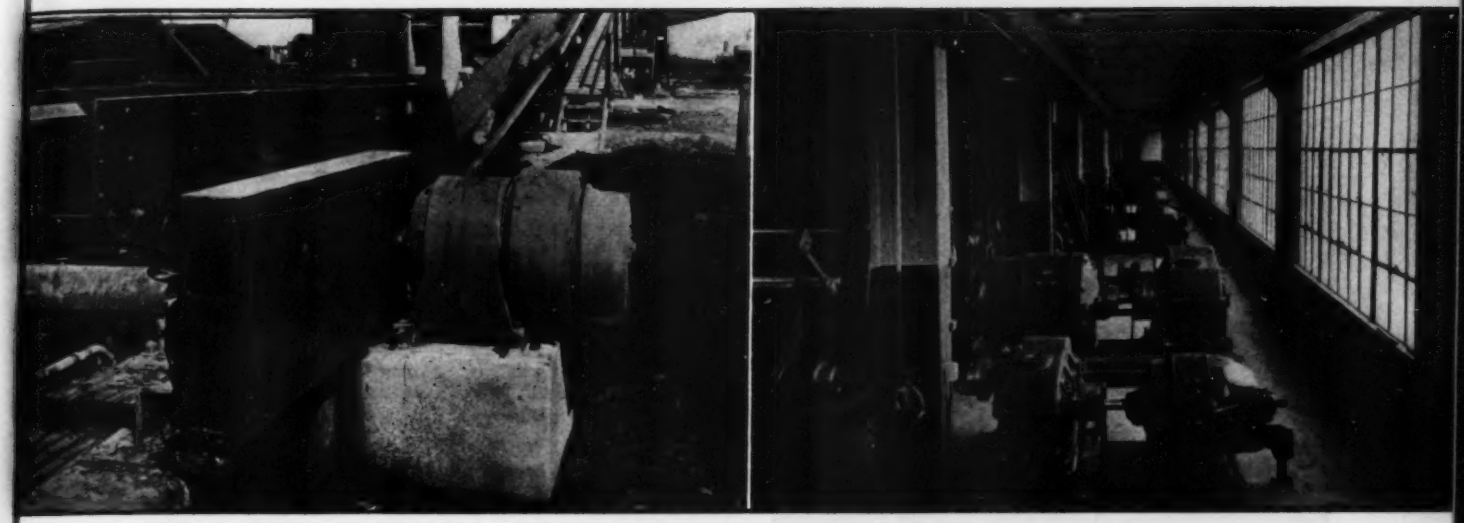
The lineshaft may be driven by single motor with close speed regulation and wide speed range or by a steam turbine having an electrically operated wide speed-range governor. In either case the machines for specialties must operate at any speed between high and low limits and produce a sheet within close tolerances throughout this range. Most of the new and many of the old rebuilt machines are equipped with electrical sectional drives.

The use of the electrical sectional drive units for existing machines makes many modifications possible which could not be introduced by mechanical means.

The great increase in the sale of papers with special inserts and magazines has brought an increased demand for high grade papers for rotogravure and color printing, which in turn necessitates the modification of existing machines to make them. Often size or coating must be applied during the paper making process. This application usually takes place between two dryer sections so that the existing dryers may have to be split and the new units introduced between them. In order to assure uniform acceleration and deceleration, such a change often involves a study of machine and motor



Left—200 hp.—.8 leading PF—direct connected synchronous motor mounted on base of 88-inch chipper. Right—Double automatic extraction turbine-generator with cubicle type switchboard, in a paper mill



Left—Splashproof gear-motor driving wood conveyor. Right—Back side of modern paper machine equipped with electric sectional drive

characteristics to "match" the response of the various units. It is obvious that machine sections, having low inertia or flywheel effect, as is the case with presses, must be handled differently from the power application standpoint, than dryer sections which have high inertia. This realization has led to the development of the principle of "acceleration constants" applied to paper machines. By properly selecting the driving units, any separate section of a paper machine may be motorized, even if the rest of the machine is mechanically driven, and the whole will operate as a harmonious drive.

The same principle is used in designing the modern electric sectional drive; each section of the machine to be motorized is analyzed to determine its WR^2 and a motor is selected so that throughout the entire machine the product of WR^2 and motor armature resistance for each section is approximately a constant. When this method of motorizing is used, greatly improved regulation of the machine during acceleration and deceleration results.

Machine modifications and particularly the addition of motorized sections should only be undertaken after due consideration of this principle. Otherwise, the machine may tend to "tear apart" when the speed is changed. Since the realization of this principle has become well understood many changes have been made and many modifications undertaken which were not previously considered practical.

In one large Eastern mill it was considered desirable to modify a machine to make coated paper. Additional dryer sections had to be added and the rebuilt machine was extended out into the finishing room. The basement below this finishing room could not be used for an extension of the lineshaft. Electrical units were added to drive the new sections of the machine. These units were mounted directly on the machine room floor and the new units were tied in electrically to the lineshaft drive for the old sections. The whole machine operates successfully over a speed range of 10 to 1 making a wide variety of papers. Such a change in this machine could not have been made if it were not for modern engineering methods and materials.

The modern cylinder machine may be equipped with a completely electrified wet end drive; such an arrangement saves felts and reduces maintenance and improves the product, but in some machines only a partial rebuilding program may be economical. Perhaps a new suction roll is to be installed. The addition of such a unit to the already well loaded felt may seriously reduce the felt life. The answer to the problem is found in the individual motor drive where a separate motor supplies the power to drive the new roll and so prevents that extra stress on the felt. Perhaps a new or better product results; possibly higher speed from the same equipment may be obtained.

In making a major changeover, such as is involved if a backline shaft has to be replaced, the mill operator was at one time faced with a lengthy shut down. Today it is possible to make such a change using the week-end shut down time only. A master speed reference unit can be driven from the old lineshaft and a section at a time may be electrified. As each section motor is installed, it is controlled by means of a speed regulator from the lineshaft which establishes the reference speed.

The great mechanical flexibility of electric driving units permits their installation within the restricted space usually available where old machines are being modernized. Suction rolls, pressure rolls, primary and baby presses, cylinder molds and top rolls—all may be motorized to apply a known power at the point where it will do the greatest good. The use of such helper drives usually reduces operating and maintenance costs.

Future Trends

The paper industry will change and expand in the years to come. Changes will come through the introduction of new kinds of paper and the necessity of lower costs; expansion will come through increased production. Most mills have heretofore met all of these conditions and the future plant engineers will be able to do likewise because the machinery manufacturers and electrical manufacturers will keep abreast of needs of the paper industry.

Paperboard Mill Saves $600 a Day on Power

EDWARD R. FEICHT, Mechanical Engineer

The power plant at the paper mill of Container Corporation of America, Philadelphia, is simple in architectural design, with abundant daylight and ventilation

THE history of power in the plant of the Container Corporation of America, Manayunk, Philadelphia, Pa., closely parallels the history of the paper industry as a whole during the past two decades. In 1915, the Philadelphia Paper Company, predecessor of the Container Corporation, found itself with a long row of horizontal return tubular boilers, fifteen in number, hand-fired, troublesome and costly in fuel, labor and maintenance. That year the company modernized by building a new boiler house. The new boiler house was equipped with three 636-horsepower water tube boilers, fired by underfeed side dump stokers, and with a coal handling system which included an elevator, a 500-ton elevated bunker and chutes to the hoppers of the stokers. Ash handling was by bucket and mono-rail crane. This plant was an improvement to be proud of and one that must have returned a large percentage on the investment.

In 1917, being pressed for power, two more boilers of the same type were added; and, in 1918, another pair was installed. In 1921, a departure was made when two 800-horsepower, 4-drum, bent tube boilers, designed for 200-lb. pressure, were installed. These boilers were equipped with superheaters and economizers. Likewise a 1850 kv.-a. twin four valve engine to take steam from these boilers and to exhaust at 40 lb. back pressure, was put in the engine room to care for a new (160-inch trim) board machine that was being installed.

At some previous date, a 1500 kv.-a. cross compound had been installed to exhaust at 3 to 5 pounds back pressure. The paper machines (then five) were driven by individual engines, some of which exhausted at 40 pounds and some at 3/5 pounds. Power was being purchased in addition to that being generated. The three sources of power were operated independently of each other and not in parallel. This condition was corrected, probably in the early 1930's, and parallel operation of the three main electrical sources was carried on thereafter.

Even under these conditions of operation and due to frequent changes in types of paper being made and the consequent changes in electrical and steam demands, to paper breaks and the usual run of paper mill contingencies, the Container Corporation came to 1934 with the Power Department acting at times as the limiting factor in the output of board.

Frequently, jordans had to be backed off to reduce the electrical load—3-pound steam would be blowing to the atmosphere and not enough 40-pound steam would be available to dry the board that was being made. Maintenance which had been deferred during the lean years of 1932 and 1933 made its demands felt. The gradual substitution of electrical for steam drives increased and additional power was being required for operations outside of the mill proper until the power demand exceeded the supply available. To crown it all, it looked as if the pressure permitted on the boilers must be reduced. The modern power plant of 1915/1920 was in need of *modernization*.

Fortunately, for several years, rather complete power records had been kept and were made available to the engineers of H. M. Wilson Company, who were called in to make a complete study of the power situation. These records, going beyond the "Total cost divided by tons" figure of the accountant, might it be said, were the first steps in "Saving $600 a day."

As a result of the Engineer's Survey, recommendations for a high pressure boiler plant with a double extraction, condensing turbine were adopted and work on the plant started in 1934. The first move was to increase the capacity of the two 800-hp. boilers by lowering the bottoms, providing water walls and installing a pulverizer and two burners to each boiler. Through this work, the capacity of each of the two boilers was increased from the nominal 800 hp. to a nominal 55,000 pounds per hour and an actual sustained capacity of 65,000 pounds per hour.

With this increased capacity, and, after considerable repair work on the boilers, it was possible to remove Number 1 and Number 2 boilers and extend the building to accommodate a new steam generator. The removal of boilers 10 and 11 provided space for additional water

treatment facilities and two new 700-pound—450 gal. per min. six stage boiler feed pumps as well as for the relocation of the low pressure (200 pound) feed pumps.

An addition to the old engine room was built adjacent to the end of the boiler room to house a new turbine generator and switchboard and to provide space for a future generator.

Essentially the new power equipment installed consists of a boiler designed for 536 pounds pressure, 635 degrees total temperature, and 505 pounds at the superheater outlet. The boiler, designed for a continuous output of 175,000 pounds per hour and for a peak of 200,000 pounds, easily carries a peak of 225,000 pounds. The average output over a typical 30-day period was 196,000 pounds per hour.

The electrical generation for the plant is cared for by a 6,250 kv.-a. turbine generator provided with one extraction point for 170 pound steam and one for 44 pound steam.

The four drum bent tube boiler has 12,410 square feet of heating surface, is water walled on four sides with 4,700 square feet of water tubes, and has a refractory bottom or ash pit, while the air heater is of the straight tube, single pass type and has 16,800 square feet of heating surface. The induced draft fan discharges the products of combustion into the old steel stack, which supplied draft to the first five of the old boilers and which was continued in service. If required, the air heater and fan may be bypassed and up to 90,000 pounds of steam per hour generated on natural draft.

The inlet scroll of the induced draft fan at its narrowest part is provided with a narrow opening through which the portion of gas carrying the heaviest concentration of fly ash, is abstracted and carried through a "cyclone" where the ash is deposited and the gas returned to the inlet of the fan.

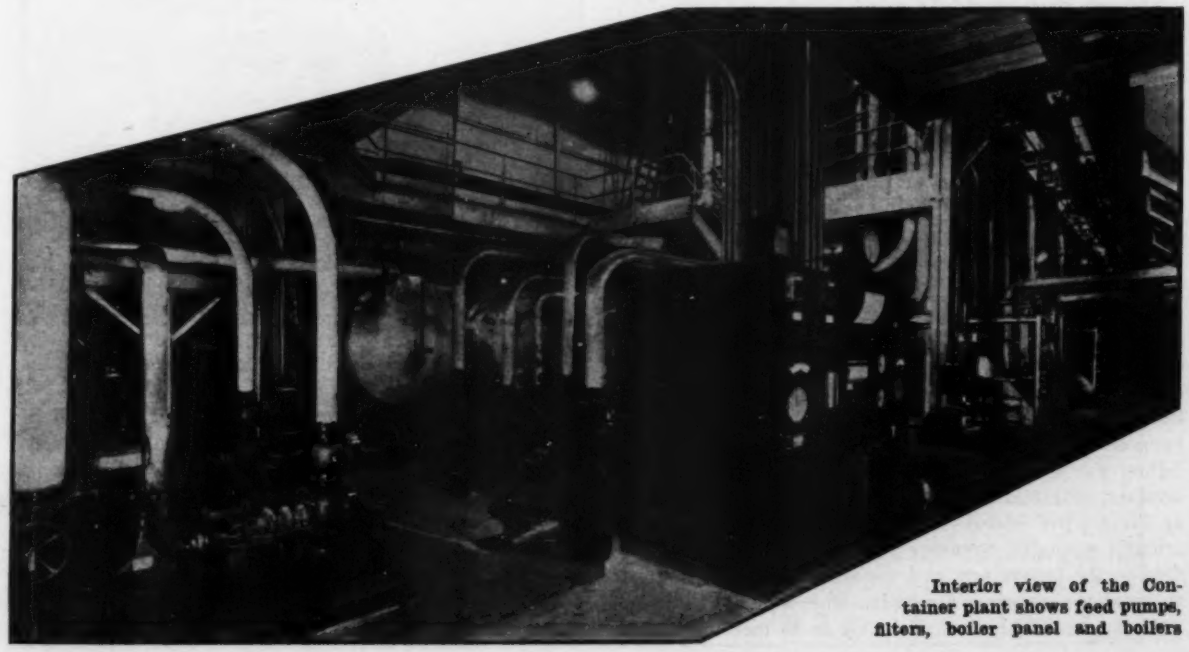
The fly ash, caught here, at the base of the stack and at the last pass of the boiler, is piped to the main ash disposal system and removed periodically as required. An unexpected correlary to the burning of coal in pulverized form has been the remarkable reduction in the amount of dirt and cinder observable around the mill and vicinity which had formerly been so troublesome with the old underfeed stokers.

All the ash for the three boilers is handled by a vacuum ash system through some 18 points of ash accumulation and has a capacity of 12 tons of ash per hour. The storage tank, of vitrified tile, has a capacity of over a carload of ashes and is emptied through a dustless unloader directly to the cars. This system, in operation more than two and one-half years, has required very little maintenance, and that has been confined to renewable elbows.

Coal from the old bunker is supplied to the pulverizers by weigh larry. Each of the two pulverizers for the new boiler has a capacity of 12,750 pounds of coal per hour and each delivers its pulverized coal through a turbulent type burner set to "toe in," an arrangement which assists in giving a short intense flame free from contact with wall surfaces. The coal fineness varies from 85 per cent to 75 per cent through a 200 mesh sieve, depending on the coal, the condition of the pulverizer, load, etc.

In June, 1937 all the wearing parts of one of the pulverizers were renewed, bringing the pulverizer into "new" condition. Fifteen months had passed since the last previous renewal and 43,566 tons of coal had been pulverized during the period. Up to the time of this last renewal, the machine had pulverized 72,617 tons of coal at a repair cost for labor and material of $.0187 per ton of coal pulverized. The kilowatts used run 12/14 per ton.

Primary air, approximately 10 per cent of the total to the boilers—the high pressure boiler and the two 170 pound boilers—is provided at 430 degrees from the air heater of the large boiler for drying the coal



Interior view of the Container plant shows feed pumps, filters, boiler panel and boilers

in the pulverizers and carrying the coal to the burner.

For lighting off and shutting down the boilers, a small but complete oil burning system is permanently installed by inserting high pressure mechanical burners through the center tube of the coal burner. This system has been of great assistance in carrying the load during periods of coal shortage.

Fifty to sixty per cent of the steam generated returns to the boiler house as condensate, leaving forty to fifty per cent to be made up from the mill supply.

Pneumatic ash handling system assures clean, convenient and dustless operation

This make-up water is treated in a hot process softener. Both the condensate water and the make-up water are deaerated, filtered and receive an aftertreatment of phosphate to remove the last traces of hardness; and a small amount of sulphite removes the last of the oxygen. As a result of the treatment, no trace of corrosion has been found when the tubes have been wire brushed once a year for boiler inspection.

A continuous blow down system controls the salt concentration and disposes of the concentrates with a minimum loss of heat by blow down.

The boiler feed pumps are the only units installed with spares, a necessary precaution, and since one is turbine and one motor driven, the operator can use the one which gives the best heat balance for the mill operation at any time. The turbine driven pumps for both high and low pressure boilers are controlled by excess pressure governors, working in conjunction with water level controls.

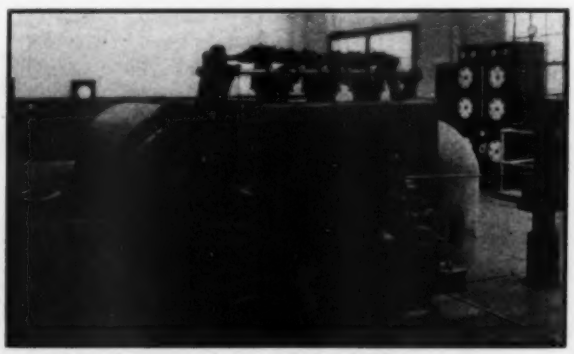
A simple system of boiler pressure and combustion control is provided and consists of an electrically operated damper at the induced draft fan, controlled by the pressure in the boiler furnace. Lights indicate the open or closed position of the damper and when either lights, the speed of the fan is adjusted to throw the damper near mid-position. This speed change is made at the control board in front of the boiler. An electrically operated pressure regulator controls the coal feed to the pulverizers and the air supply to the burner to meet the varying demands. The control, while not entirely automatic, is sufficiently so to meet the needs.

All the steam from the new boiler is delivered to the turbine room to be used by the turbine for the generation of electricity and in providing first, the 40-pound steam needed in the dryers and then that portion of the 170-pound steam demand that can be provided within the quantity limitations of the generator and the high pressure boiler. The balance of the 170-pound needed is provided by the 55,000-pound boilers, one in the summer and two in the winter and/or by the 500 to 170 reducing valve if necessary.

The generator is rated at 6,250 kv.-a. at 80 per cent power factor and the turbine is designed to deliver the rating at 100 per cent power factor. The power factor of the system was raised to 92 and the turbine is generally operated at 5700/6000 kw. at 460 volts.

The turbine develops most of its power using the pressure drop from the inlet pressure to the 44-pound stage. This 44-pound steam demand may run as high as 150,000 pounds; is generally from 110,000 to 125,000; but may drop as low as 25,000 pounds. When this happens, the grid valve opens to pass steam into the low pressure end of the turbine where it generates power on its way to the condenser designed for 25,000 pounds per hour. The steam so used does not average more than 5,000 pounds per hour. The condenser acts to save the steam that formerly blew to the atmosphere to the annoyance of the manager, the engineer and the neighbors.

Necessary flow meters, electric meters, recording meters and gauges, regulators, relief valves, etc. have been installed at all strategic points to handle changes that inevitably occur in a paper mill. These instruments and controls have been centralized in the turbine room. Here are flow meters for the three operating boilers, for both extraction flows from the turbine and to the condenser, through the 500 to 170, the 170 to 40 and 40 to 3 pound reducing valves in various locations in the plant; the electrical instruments, indicating,



A 5000 kw. double extraction turbine

integrating and recording; the demand meter; and the control of load distribution on the three possible generators in the mill and of Utility power. Here also is located the control for distant reducing valves which can be opened, closed or made automatic.

What may well be termed the "Tools" for the $600 savings a day have been listed in considerable detail for it is on these tools that the savings must of necessity be based.

The next step in the saving campaign was the setting up of standards of performance of these tools and of the personnel to operate them.

Immediately after the equipment was put into regular operation, February 28, 1935, a set of record sheets was established. These sheets include a boiler room log (by shifts), a water treatment log (by shifts), a turbine room log (by shifts), a detached engine room log (by shifts), a power production sheet (daily), and a power distribution sheet (daily).

All essential gauge and meter readings are recorded on the log sheets and in addition, records of pressure or temperature are entered which require the operator to go hourly to strategic points which otherwise might be missed for long periods of time. The regular writing down of load, voltage, pressure and flow figures soon establishes firmly the normal conditions of operation, departures from which are immediately noticed.

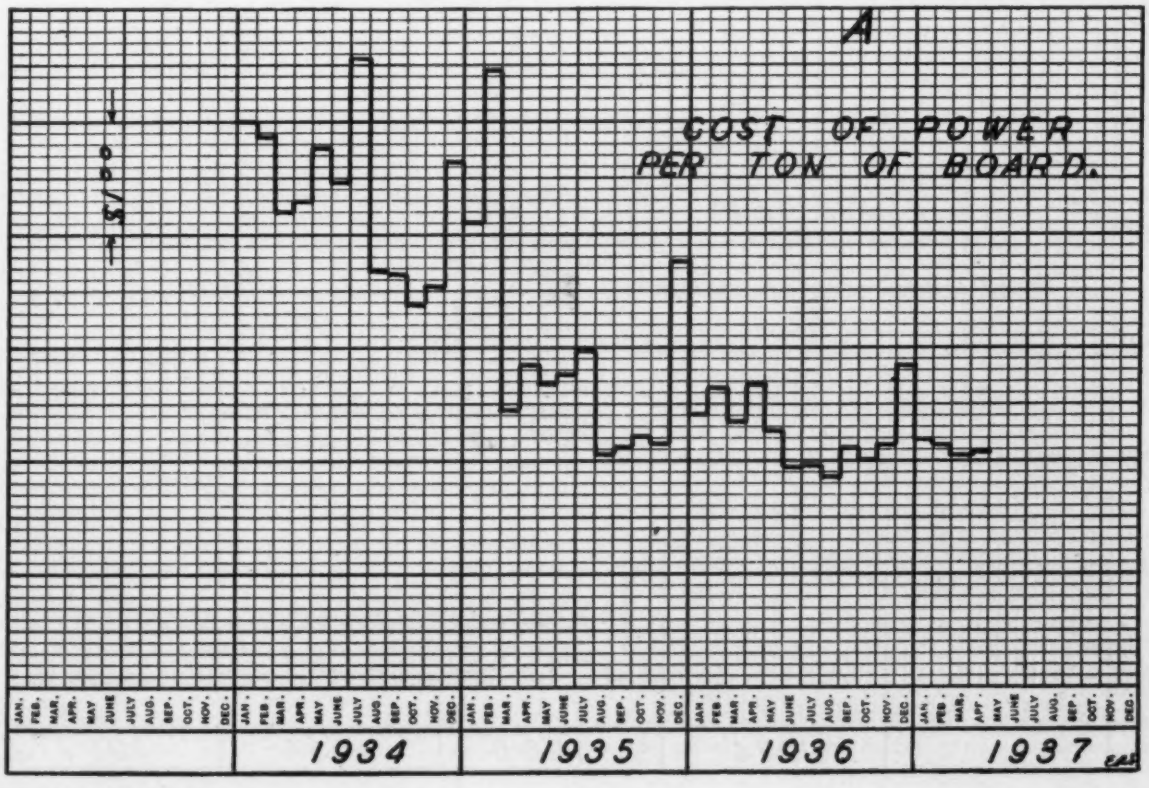
On the turbine room log, the supervisor in charge of each tour must enter his remarks on operations during his shift even if he has nothing to report other than "Operations OK." These remarks are now frequently quite voluminous and in connection with the log itself are of inestimable value to the succeeding supervisor, the power superintendent and for reference.

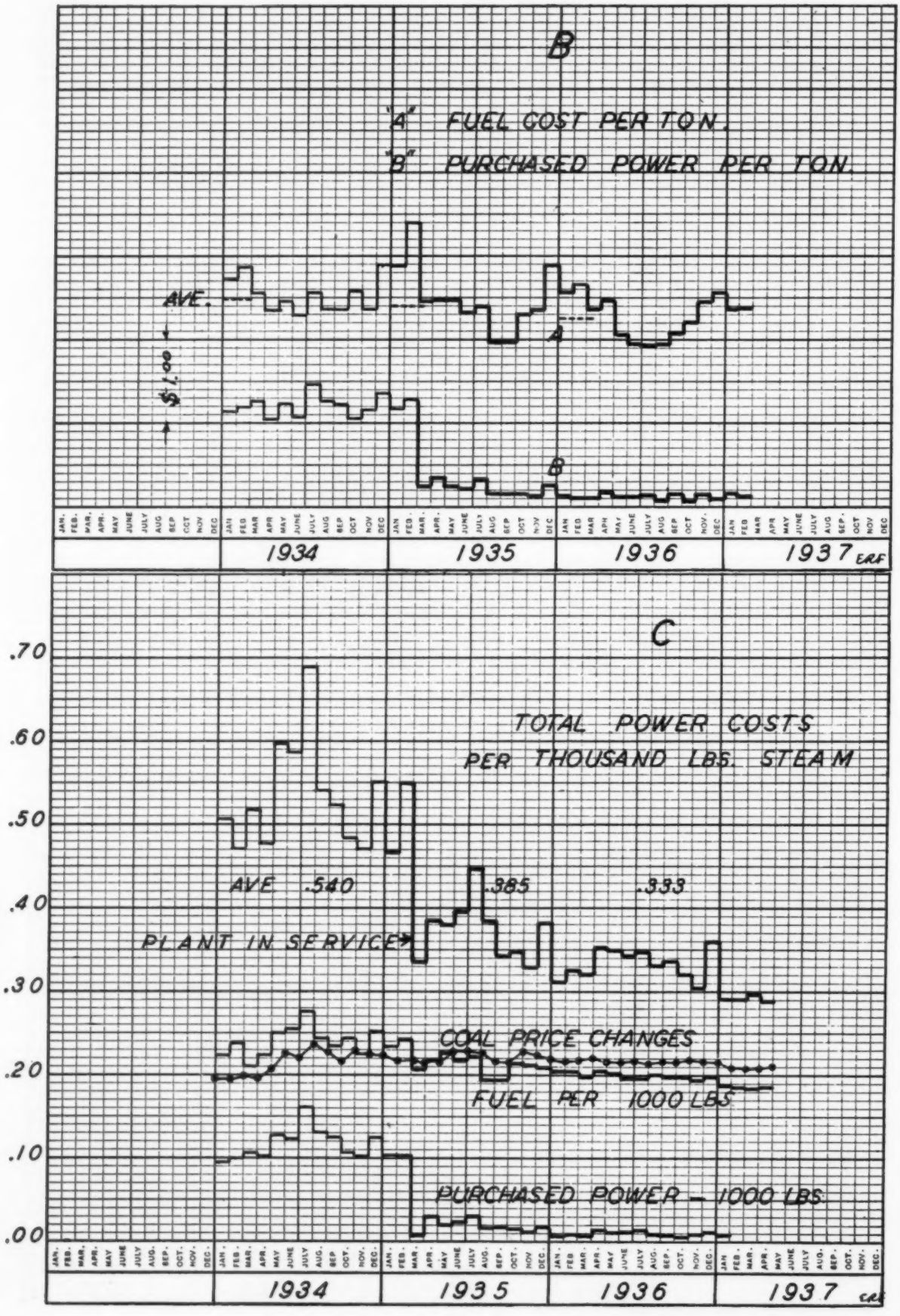
Coal tickets from the weigh larry, logs and recording charts from the boiler, turbine, engine rooms and throughout the paper mill are collected by a meter man when he changes charts each morning. He then makes out daily power production and distribution sheets and by 10:30 A.M. has a brief summary of the previous day's operations on the power superintendent's desk and has telephoned similar information to the manager's office. Such a summary covers: Total steam generated; evaporation per pound of coal; steam used per ton of board produced; kilowatts generated; kilowatts purchased; and kilowatts per ton of board. Departures from normal are here again immediately noted and checked to see if conditions have been returned to normal.

The constant daily checking, augmented by monthly cost figures, has given encouragement to further cost reductions. The firemen, engineers and operators are more and more interested in the cost angle as a higher type of man is attracted to the plant when openings occur as a result of natural turnover in labor. One of the operators is a university graduate interested in power. Four or five are graduates of the Pennsylvania School Ship Annapolis and one of whom has taken a two-year night course in a local technical college. Others are high school graduates; and the balance are the old personnel who had it in them to be trained in new ways and to new standards.

The result of the new plant, the new technique and trained personnel has been to reduce the cost of power per ton of board as shown on Chart A, which covers total costs by months from January 1934 to May 1937. This curve is drawn to show accurately the variation in cost including everything applicable to the power department; fixed charges, insurance, taxes, fuel, labor, supervisors, repairs, purchased power, etc. Differences in monthly cost can be picked off the chart as each small vertical division represents $.10 per ton. The base line, however, has been shifted so that the total dollars cannot be read off the chart.

Chart B shows the cost of fuel per ton and purchased power per ton. It may be noted from this chart that while the average cost of purchased power per ton of




B
"A" FUEL COST PER TON.
"B" PURCHASED POWER PER TON.
AVE.
$1.00
A
B
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT NOV DEC
1934
1935
1936
1937 est
C
.70
.60
.50
.40
.30
.20
.10
.00
TOTAL POWER COSTS
PER THOUSAND LBS. STEAM
AVE .540
.385
.333
PLANT IN SERVICE
COAL PRICE CHANGES
FUEL PER 1000 LBS
PURCHASED POWER — 1000 LBS.
1934
1935
1936
1937 est

board decreased $1.096 per ton after the new equipment was started and practically all the electrical power was made in the plant, that the fuel cost per ton also decreased $0.254.

Chart C shows the cost of fuel per thousand pounds, that is all power department costs, including engine rooms, divided by thousands of pounds of steam generated. All steam is adjusted to the basis of 170 pounds for comparison with conditions prior to 1935. The light line shows the cost of 100 pounds of coal during the period.

A careful check of the figures will show that a saving of the seemingly impossible figure of $600 a day over the cost of power three years ago has been attained.

Waste Heat Recovery in Sulphate Pulping Process*

THE major item of waste heat recovery in the sulphate or soda pulp mill is the calorific value of the lignins extracted from the wood during the cooking operation in the digester, which lignins, together with the chemicals used in the cooking, are discharged from the digester in the black liquor.

Since the inception of the sulphate process as a modification of the earlier soda process, about 1879, various efforts have been made to recover the chemicals in the black liquor and to utilize advantageously the calorific value of the lignins in the heat balance of the pulp mill. The earliest attempts accomplished a partial evaporation of the black liquor itself prior to its incineration for the recovery of chemicals. Subsequently, this partial recovery of heat was augmented by the installation of waste-heat boilers generating steam that could be usefully employed in the pulp mill, but it has been only quite recently that the same degree of attention has been given to the recovery of heat in the black liquor as to the recovery of chemical, with the result that in the modern sulphate mill the recovery unit not only recovers the chemical, but also the heat to an extent sufficient to generate steam and power beyond the requirements of the pulp mill itself. In other words, the pulp mill can be made self-supporting with the steam and power generated from the black liquor and bark waste, with a surplus available for paper mill and other use.

This economic balance has been due in part to the development and improvement in efficiency of coordinated pulp mill equipment, such as evaporators, causticizing systems and the like, as well as modified cooking systems employing external heaters with forced circulation as against direct steaming, with a recovery of heat from the digester blow steam for the production of hot water, the net results of these improvements being a material reduction in the net steam and power requirements of the pulp mill per ton of pulp produced; but probably the largest contributing factor to the attainment of a self-sustaining mill has been the improvement in the utilization of the "waste" heat with the greater production of steam and power to meet the demands.

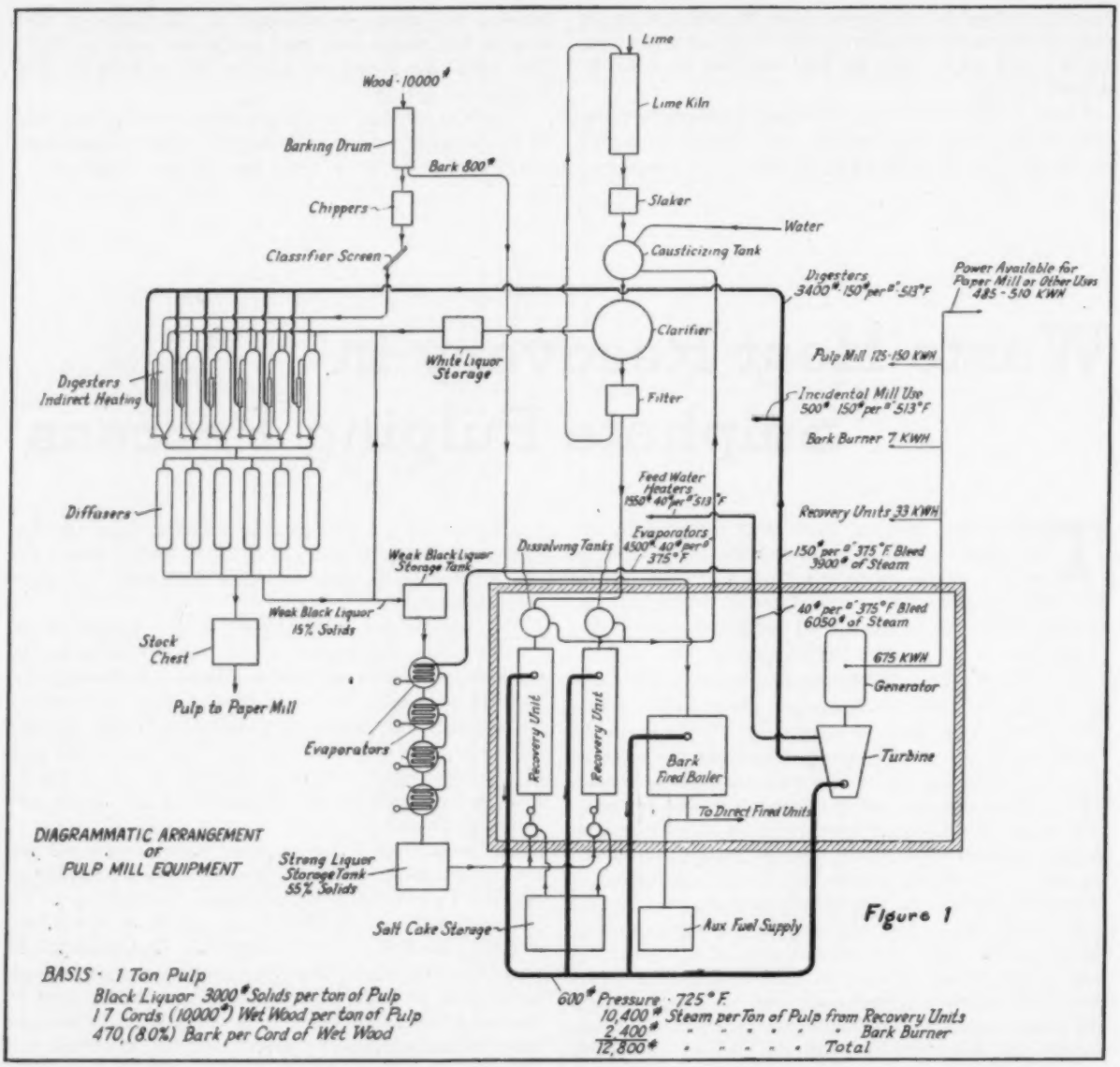
To consider the development in this utilization of "waste" heat, one might consider the circumstances as applied to an average mill condition. Following the cooking operation, the weak black liquor is available for recovery purposes at approximately 11 deg. Baumé, measured at 60 deg. Fahr., or say 15 per cent solids and 85 per cent water. A typical analysis of such a liquor, also the analysis of the dry solids of the liquor are shown in Table 1.

The weak black liquor as noted contains only 8.3 per cent combustible, having a calorific value of 976 B.t.u. per lb. To evaporate water present, amounting to 85 per cent, will require 970.3 B.t.u. per lb. or 825 B.t.u., assuming the liquor is at 212 deg. Fahr. and atmospheric pressure. Obviously, therefore, as the amount of heat involved is so little in excess of the amount necessary for complete dehydration, it is not possible to accomplish the dehydration by direct heat transfer from the gases resulting from the incineration of the liquor solids.

This situation naturally resulted in the application of multiple-effect evaporators for a partial evaporation of the water in the liquor, the balance of the evaporation to essentially complete dehydration being accomplished by direct heating of the gases in disk evaporators and rotaries. Double or triple effect evaporators, with steam for the first heating stage being obtained from direct fired boilers were commonly employed, the recovery system under these conditions consisting of evaporators and rotary and smelter unit with a disk evaporator installed in the passage of the hot gases leaving the rotary. The amount of heat recovered under these circumstances was, therefore, small, amounting only to a partial evaporation of the liquor in the disk evaporator and the rotary.

The more efficient evaporation of the weak liquor in multiple-effect evaporators led to the greater portion of the evaporation being accomplished by these means, and with a greater amount of heat thus being available in the gases leaving the rotary, the next obvious step

(*) This article is not staff written. It was prepared on special assignment by an engineer who has had wide experience in the field, but who desired to treat the subject without identification.


Lime
Wood · 10000 #
Lime Kiln
Barking Drum
Bark 800 #
Slaker
Chippers
Water
Classifier Screen
Causticizing Tank
Digesters 3400 #, 150 # per ° 513 °F
Power Available for Paper Mill or Other Uses 485 - 510 KWH
Clarifier
White Liquor Storage
Pulp Mill 125-150 KWH
Digesters Indirect Heating
Filter
Incidental Mill Use 500 # 150 # per ° 513 °F
Bark Burner 7 KWH
Feed Water Heaters 1150 # 40 # per ° 513 °F
Diffusers
Recovery Units 33 KWH
Evaporators 4500 #, 40 # per ° 375 °F
Weak Black Liquor Storage Tank
Dissolving Tanks
150 # per ° 375 °F Bleed 3900 # of Steam
Weak Black Liquor 15% Solids
40 # per ° 375 °F Bleed 6050 # of Steam
Stock Chest
675 KWH
Generator
Pulp to Paper Mill
Recovery Unit
Recovery Unit
Evaporators
Bark Fired Boiler
Turbine
To Direct Fired Units
DIAGRAMMATIC ARRANGEMENT OF PULP MILL EQUIPMENT
Strong Liquor Storage Tank 55% Solids
Salt Cake Storage
Aux Fuel Supply
Figure 1
BASIS · 1 Ton Pulp
Black Liquor 3000 # Solids per ton of Pulp
17 Cords (10000 #) Wet Wood per ton of Pulp
470 (8.0%) Bark per Cord of Wet Wood
600 # Pressure · 725 ° F.
10,400 # Steam per Ton of Pulp from Recovery Units
2,400 # " " " " " Bark Burner
12,800 # " " " " " Total

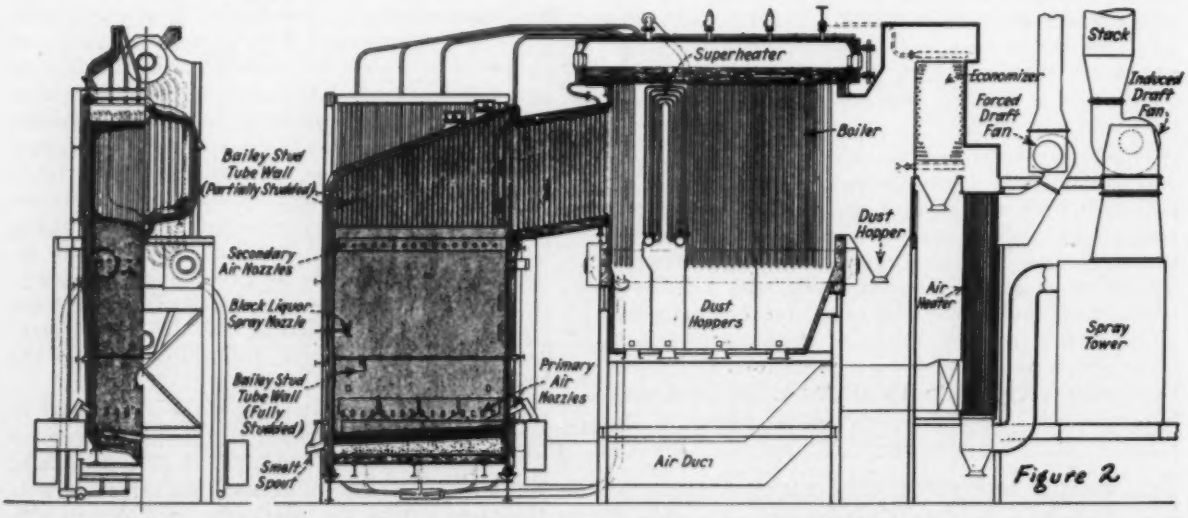

Superheater
Stack
Economizer
Induced Draft Fan
Forced Draft Fan
Boiler
Bailey Stud Tube Wall (Partially Studded)
Dust Hopper
Secondary Air Nozzles
Air Heater
Black Liquor Spray Nozzle
Dust Hoppers
Spray Tower
Primary Air Nozzles
Bailey Stud Tube Wall (Fully Studded)
Air Duct
Smelt Spout
Figure 2

TABLE 1—Proximate Analysis

Combustible	Per cent,	8.3
Inorganic chemical or ash	Per cent,	6.7
Water	Per cent,	85.
Total	per cent,	100.0
Calorific Value—B.t.u. per lb.		976
Analysis on the basis of dry solids		
Combustible		
Carbon	Per cent,	38.5
Oxygen	Per cent,	9.5
Nitrogen	Per cent,	0.1
Hydrogen	Per cent,	3.7
Sulphur	Per cent,	3.6
Total combustible	Per cent,	55.4
Inorganic chemical or ash	Per cent,	44.6
Total	Per cent,	100.0
Calorific Value—B.t.u per lb.		6,500

was the installation of waste heat boilers, with the utilization of the steam generated in such boilers in the evaporators and/or digesters. These waste heat boilers were installed between the rotaries and disk evaporators, and normally were operated at low pressures,—around 150 lb. per sq. in. While this represented a material advance in the utilization of the heat in the black liquor, it was still far from the most efficient use of this available heat.

It is only within the past few years that attention has been given to attaining the maximum efficiency in the utilization of this waste heat. In order to accomplish this, the best present day practice in boiler and furnace design and construction has been utilized with the object in view of attaining the best possible heat recovery consistent with the maximum recovery of chemical.

TABLE 2

Input	B.t.u.	Per cent
Calorific value of 1 lb. of black liquor solids	6,500	97.8
Sensible heat in black liquor	150	2.2
Total	6,650	100.0
Output		
Heat absorbed by water and steam	4,000	60.1
Irreducible Heat Uses		
1. Endothermic heat of reduction of Na_2SO4 to Na_2S	250	3.8
2. Sensible heat in smelt discharged from furnace	227	3.4
3. Latent heat of moisture in fuel in first stage dehydration	855	12.9
4. Latent heat of hydrogen in fuel	374	5.6
Total irreducible uses	1,706	25.7
Heat usefully absorbed in direct evaporation in Spray Tower	381	5.7
Losses		
5. Sensible heat in stack gases	297	4.5
6. Radiation and unaccounted for	266	4.0
Total losses	563	8.5
Total	6,650	100.0

A flow sheet for an average sulphate mill is shown in Figure 1. The figures given are on a ton basis, and have been approximated for such an average condition, based on 1.7 cords of wet wood (approximately 10,000 lb.) per ton of pulp produced. The black liquor is assumed to contain 3,000 lb. of total solids of an analysis given in Table 1 per ton of pulp produced.

Further assumptions made are that 8.0 per cent of the wet wood is bark and waste, having a calorific value and analysis as given in Table 3, and as such is available as a fuel for generating steam. The digesters have been assumed to have external heaters, utilizing 3,400 lb. of 150 lb. per sq. in. steam per ton of pulp, and the evaporators quadruple-effect, with a steam rate of 3.2 lb. of water evaporated per pound of steam, thereby requiring 4,500 lb. of 40 lb. per sq. in. steam per ton of pulp produced to concentrate the weak black liquor from 15 per cent solids to 55 per cent solids, at which concentration it can be employed for recovery.

With the above assumptions and the following operating conditions:

Solids in weak black liquor	per cent	15.0
Solids in concentrated black liquor	per cent	55.0
Weight of Na_2SO_4 added per pound of black liquor solids	pounds	0.08
Gas temperature leaving air heater	° Fahr.	400
Gas temperature to stack	° Fahr.	220
Feedwater temperature	° Fahr.	240
Room temperature	° Fahr.	80
Excess air	per cent	25

the heat balance for the recovery unit can be determined.

The recovery unit upon which these calculations have been based is shown in Figure 2. This unit is designed to handle 28,500 lb. of black liquor per hour, concentrated to 55 per cent solids, which on the assumed basis of 3,000 lb. of solids per ton of pulp produced is equivalent to the production of 125 tons of pulp per day. The boiler is of the B&W 3-drum type, there being one upper and two lower drums connected by a bank of essentially vertical tubes,—this arrangement being particularly selected in order to handle with the greatest possible ease the chemical carried over in the gases from the furnace, and which becomes deposited on the tube surfaces. There being no baffles in the gas pass through the boiler, and with vertical tubes, the deposits of chemical on the tubes can be readily and easily removed, dropping into the hopper which extends below the full length of the boiler. This hopper is divided into a number of chambers by steel division plates, the object of these plates being to prevent the bypassing of the gases past the boiler heating surfaces, but the plates themselves extend only up to and not into the boiler heating bank. A fully draining superheater is located within the boiler tube bank in a position where the desired superheat temperature of the steam can be readily obtained.

The furnace is entirely water-cooled, as also is the throat connecting the furnace with the boiler, and is so designed as to permit the continuous flow of molten smelt or chemical from the hearth of the furnace to the

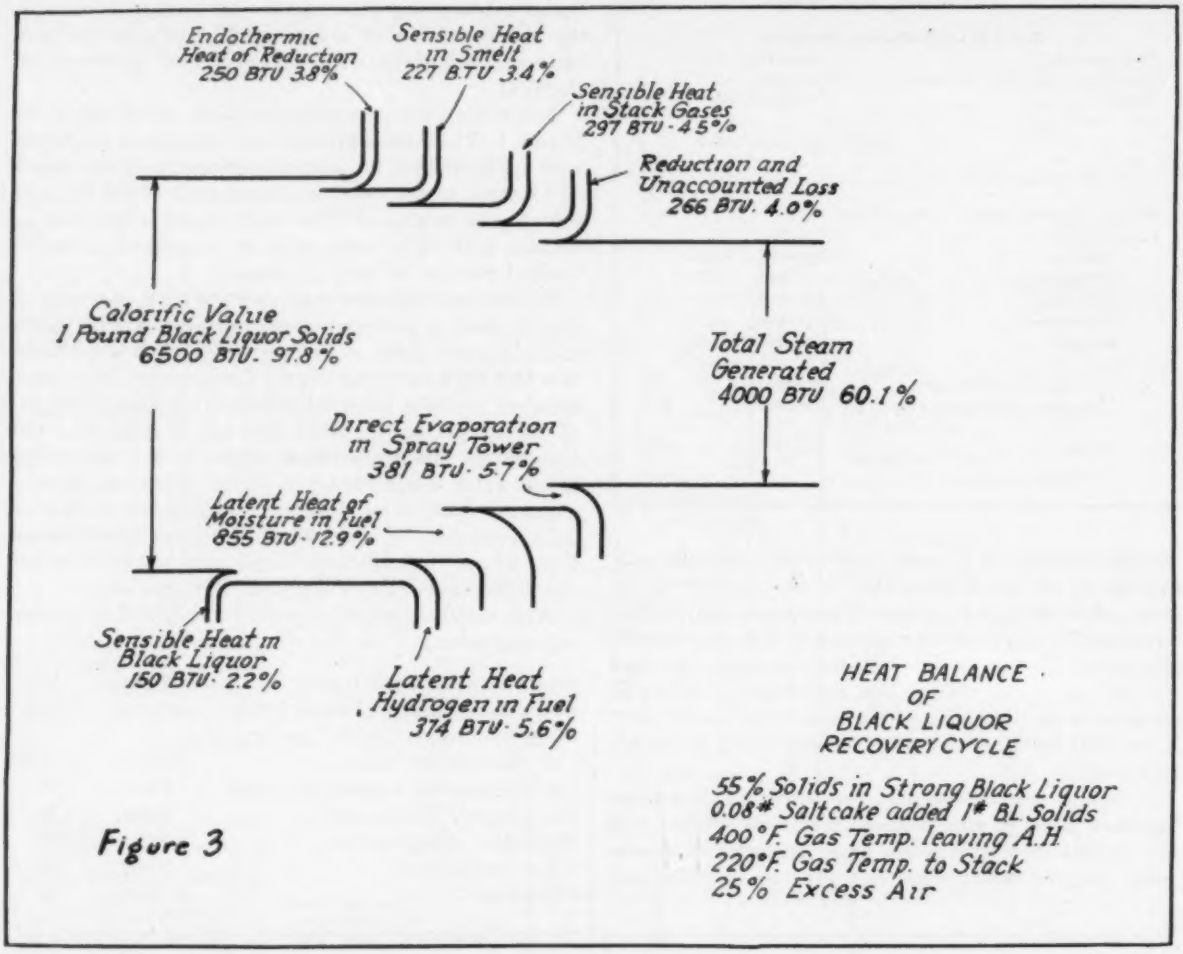

Endothermic Heat of Reduction 250 BTU 3.8%
Sensible Heat in Smelt 227 B.T.U 3.4%
Sensible Heat in Stack Gases 297 BTU - 4.5%
Reduction and Unaccounted Loss 266 BTU. 4.0%
Calorific Value 1 Pound Black Liquor Solids 6500 BTU. 97.8%
Total Steam Generated 4000 BTU 60.1%
Direct Evaporation in Spray Tower 381 BTU - 5.7%
Latent Heat of Moisture in Fuel 855 BTU - 12.9%
Sensible Heat in Black Liquor 150 BTU - 2.2%
Latent Heat Hydrogen in Fuel 374 BTU - 5.6%
HEAT BALANCE OF BLACK LIQUOR RECOVERY CYCLE
55% Solids in Strong Black Liquor
0.08# Saltcake added 1# Bl. Solids
400°F. Gas Temp. leaving A.H.
220°F. Gas Temp. to Stack
25% Excess Air

Figure 3

dissolving tank. A stud tube construction is employed in the furnace, the lower portion being fully studded and covered with plastic chrome ore refractory where it is necessary to have a relatively high temperature maintained to insure the satisfactory combustion of the dehydrated char and discharge of molten smelt, while the upper portion of the furnace and the throat connecting the furnace with the boiler is of partially studded surface, in which the plastic chrome ore refractory is only between the tubes, thus exposing a greater cooling surface to the gases for greater heat absorption and resultant cooling of the gases to a temperature approximating the smelt or chemical freezing point before the gases contact with the slag screen of the boiler heating surface.

Subsequent to the boiler in the direction of gas flow is an economizer, the size of which is naturally determined by the economic conditions of the particular plant for which the installation is designed, and beyond the economizer is a tubular gas-air heater.

In the interests of maximum chemical and heat recovery, a spray tower can be installed beyond the air heater. In the case of non-foaming weak liquors, the weak liquor is sprayed into this tower in intimate contact with the gases passing there through, resulting not only in the removal of some of the chemical in suspension in the gases by the liquor, but at the same time in a partial evaporation of the liquor. This procedure, however, is not always possible, as some weak liquors have a tendency to foam. With such foaming liquors, water is sprayed into the tower for chemical recovery purposes only, the solution of chemical and water thus produced being recirculated until the concentration is obtained at which the solution can be advantageously added to the concentrated liquor admitted to the furnace, and the chemical thus collected returned to the system. As noted, with this latter method of operation, the spray tower functions solely for chemical recovery, and the heat absorbed by the water from the gases does not assist in the over-all thermal efficiency of the installation.

For a complete understanding of this recovery unit, a brief description of the combustion process involved is desirable. The black liquor, concentrated to 55 per cent solid content, has mixed with it the salt cake (Na_2SO_4) necessary for chemical make-up for the cooking liquor supply, and with the solid Na_2SO_4 in suspension is delivered by means of an open impeller single-stage contrifugal pump at a pressure of approximately 50 lb. per sq. in. to a single spray nozzle located in the center of the furnace front wall, midway its height. The spray nozzle is so designed as to deliver an oscillating flat sheet of relatively large drops of liquor against the two side walls and rear wall of the furnace, where, upon impact, the liquor is essentially dehydrated and builds

TABLE 3

Carbon	Per cent,	30.5
Oxygen	Per cent,	24.6
Hydrogen	Per cent,	3.4
Ash	Per cent,	1.5
Moisture	Per cent,	40.0
Total	Per cent,	100.0
B.t.u. per lb.		5,310

up a layer of char or dehydrated liquor to a thickness of some 10 to 15 in. This accumulated char breaks off in lumps of varying size, which fall onto the hearth of the furnace, and air for combustion is admitted through a number of primary air nozzles, distributed evenly around the lower zone of the furnace in the side and rear walls. The combustible matter in the char, consisting of the lignins in the wood, are thus burned, and the chemical remaining in a molten condition following combustion of the char, percolates through the bed of char accumulated on the hearth and flows out of the furnace continuously over the smelt spout to the dissolving tank. A reducing atmosphere is maintained in the bottom part of the furnace so that the Na_2SO_4 in the liquor admitted is reduced to Na_2S according to the formulae:

(1) $Na_2SO_4 + 4C \longrightarrow Na_2S + 4CO$

(2) $4CO + 2O_2 \longrightarrow 4CO_2$

which represent a net endothermic reaction absorbing approximately 3,000 B.t.u. per pound of Na_2SO_4 so reduced. The balance of the chemical is present in the form of Na_2CO_3 and is not affected by furnace conditions, but is discharged in a molten state along with the Na_2S to the dissolving tank, resulting in a solution of green liquor. Secondary air is admitted in the upper portion of the furnace, above the char accumulations on the walls, in order to complete the combustion of the carbon monoxide rising from the bed, and such low boiling hydrocarbons that might be distilled off from the dehydrating char on the walls. The total admission of primary and secondary air is regulated to accomplish complete combustion of the combustible matter present with approximately 25 per cent of excess air.

The combustion process described is continuous, and is, as will be appreciated from the above description, essentially a two-stage process involving the first stage of dehydration in the upper portion of the furnace and the second stage of combustion in the lower portion of the furnace.

Reverting to the heat balance of the recovery unit itself, it will be appreciated that with the combustion of this low grade high moisture fuel containing a recoverable chemical ash there is a certain inevitable and irreducible minimum expenditure of heat to condition the fuel and accomplish the chemical reactions necessary. This irreducible heat utilization is comprised of:

(1) Endothermic heat of reduction of Na_2SO_4 to Na_2S.

(2) Sensible heat in the smelt discharged from the furnace.

(3) Latent heat of moisture in fuel in first stage dehydration.

(4) Latent heat of moisture from hydrocarbon in fuel. These uses of heat must be allowed for as being necessary,—the balance of the heat left being available for the generation of steam, with such losses as are unavoidably present, but which are to some extent controllable by the design and operation of the equipment. These losses are:

(5) Sensible heat in stack gases.

(6) Radiation and unaccounted for,—the balance of the heat available being utilized in the generation of steam. Obviously, radiation and unaccounted for can be kept at a minimum by the design of the unit for minimum radiation and operation at maximum combustion efficiency. The sensible heat in the stack gas loss will be varied, depending upon the amount of heat absorbing surface that can justifiably be installed, and as deter-

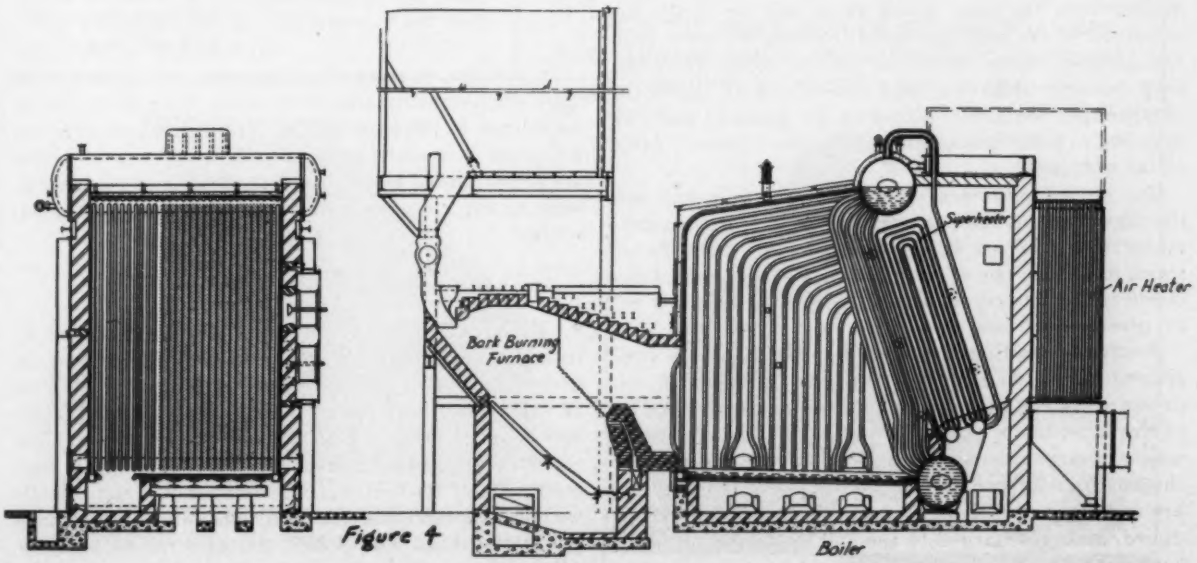


Figure 4

mined by the economic conditions of the particular unit under consideration. A factor in this connection, also, is the utilization of the spray tower previously referred to, which, when employing non-foaming weak black liquor represents an efficient utilization of the low potential heat in the gases after leaving the heating surfaces and prior to the stack, and which heat, upon absorption by the liquor resulting in the evaporation of water on an equivalent heat basis, is the heat usefully employed, and which, therefore, improves the over-all thermal efficiency of the installation.

With conditions as previously assumed, the heat balance for a unit as shown in Figure 2 will be as indicated in Table 2.

A flow diagram illustrating this unit heat balance diagrammatically is shown in Figure 3.

As far as the wet bark is concerned,—this can be burned in an auxiliary furnace to a direct-fired boiler unit, such as is shown in Figure 4. This unit is a B&W Integral Furnace Boiler with an auxiliary Hofft furnace, in which the bark is burned on a sloping grate. The main furnace of this unit is fully water-cooled and arranged for the combustion of oil or other fluid fuel as a supplemental or alternate fuel to the bark.

As previously assumed, there will be available per ton of pulp produced approximately 800 lb. of wet bark, having a general analysis as indicated in Table 3.

The heat balance of a steam generating unit comprising boiler, superheater and air heater, operating with 30 per cent excess air would be:

Heat absorbed by water and steam	per cent	65.0
Heat in dry gases	per cent	7.0
Heat in water vapor from hydrocarbon and moisture	per cent	18.0
Unconsumed combustible	per cent	5.0
Radiation and unaccounted for	per cent	5.0
	per cent	100.0

With steam generated in both the black liquor recovery unit and bark burning unit at 600 lb. per sq. in. pressure and 725 deg. Fahr. total temperature, the steam produced on the bases given above will be 10,400 lb. actual per ton of pulp produced from the recovery unit and 2,400 lb. actual per ton of pulp produced from the bark burning unit, or a total production of 12,800 lb. of steam per ton at 600 lb. per sq. in. pressure and 725 deg. Fahr. total temperature from the "waste" fuels of the pulp mill.

The largest consumers of steam in the pulp mill are the digesters and the evaporators, the average requirements of the former being approximately 3,400 lb. of steam at 150 lb. per sq. in. pressure per ton and of the latter approximately 4,500 lb. of steam at 40 lb. per sq. in. pressure per ton.

Feedwater heating is a third major item, and is considered here to be supplied from the 40 lb. per sq. in. pressure system, accounting for approximately 1,550 lb. of steam per ton of pulp produced. Other miscellaneous uses of steam in the pulp mill, such as requirements for the causticizing process, chip blowing, soot blowers, etc. are evaluated at 500 lb. of steam per ton of pulp produced, and are charged to the 150 lb. per sq. in. pressure system.

By passing the steam generated to a condensing turbine with bleeds at 150 lb. per sq. in. and 40 lb. per sq. in. for the above steam requirements, and with 28 in. of vacuum in the condenser, the power produced will amount to 675 kw-hr. per ton of pulp. This power production is based on a 6000 kw. turbine generator, which would be the size to meet the requirements of a 200-ton pulp and paper mill in which there would be available steam from waste heat in an amount of 106,800 lb. per hour at 600 lb. per sq. in. pressure and 725 deg. Fahr. total temperature. Of this generated power, the auxiliaries of the recovery unit will require in the neighborhood of 33 kw-hr. and the bark burning unit 7 kw-hr.; thus leaving a net amount of power available for the pulp mill and other uses of approximately 635 kw-hr. per ton of pulp produced. The power consumption in the pulp mill, taken up as indicated in Figure 1 in wood room preparation, digesters, diffusers, screens, evaporators, and chemical treatment equipment, will amount to between 125 and 150 kw-hr. per ton of pulp produced. The net power from the waste fuel after supplying the pulp mill needs will, therefore, amount to approximately 485 to 510 kw-hr. per ton available for other usage, such as paper mill demand.

Irrespective of the improvement in efficiency of the component equipment of the pulp mill resulting in a reduced demand for steam and power, the net economic result of this more efficient recovery and utilization of the heat in the waste fuels in the pulp is best illustrated by the savings that will be accomplished by the heat so recovered on the basis of equivalent steam costs when generated in direct-fired units. There is given below a tabulation of the value of the heat so recovered per ton of pulp on the basis of definite costs of steam per 1000 lb. from a direct-fired unit.

Value of steam cents per thousand pounds	Saving in cost of pulp production
at 15	$1.92 per ton
20	2.56 per ton
25	3.20 per ton
30	3.84 per ton

In addition to these direct savings as a result of the more efficient utilization of the heat, there must also be considered in the economic balance of the pulp mill the reduction in maintenance and operating expenses that are accomplished by the use of more modern equipment, such as the recovery unit and bark burning unit described.

◆ ◆ ◆

◆ CHARACTERISTICS OF THE LOAD must be taken into consideration and proper allowance made in designing a belt drive, no matter what type it may be. If this is not done, short belt life and unsatisfactory service may result. Because of its greater overload capacity at normal initial tension, a belt with high coefficient of friction will have longer life and operate with less slip under severe conditions, which means more production than with a belt of less overload capacity. (*Power*)

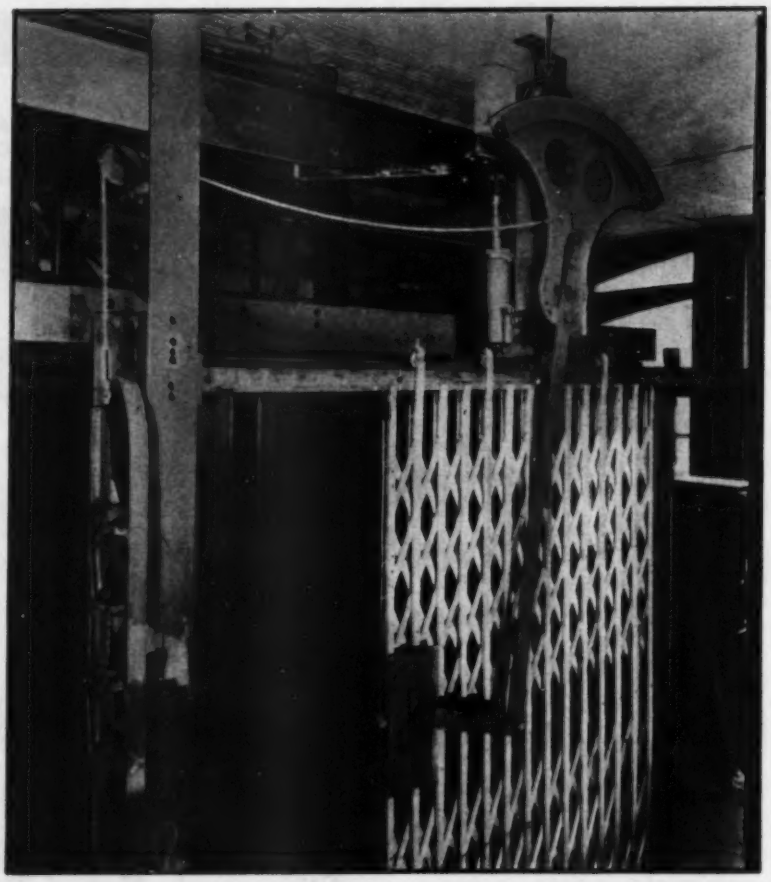
Paper Sketches---

AMONG
THE MANY PAPER PRODUCTS OF THE 1860'S WERE CUFFS, COLLARS SHIRT BOSOMS, BUTTONS, HATS AND EVEN WAIST COATS! A MAN OF THE PERIOD COULD VIRTUALLY CLOTHE HIMSELF IN PAPER!
BOUQUETS OF ARTIFICIAL FLOWERS MADE FROM CHINESE RICE PAPER WERE "ALL THE RAGE" IN ENGLAND ABOUT 1800. PRINCESS CHARLOTTE IS RECORDED TO HAVE PAID AS MUCH AS 70 GUINEAS FOR ONE OF THESE BOUQUETS.....
IN THE EARLY DAYS OF THE CHRISTIAN ERA, THE CHINESE MADE PAPER OF VARIOUS COLORS, AND THEY SIZED AND LOADED THEIR WRITING PAPER TO IMPROVE ITS QUALITY.
MORE THAN 50 PER CENT OF THE CLAYS USED FOR PAPERMAKING IN THE U.S. IS REPORTED TO BE PRODUCED IN GEORGIA.

Handling "Stalling Loads" .... Electrically

F. W. JESSOP, President
The Ohio Electric Mfg. Company

"STALLING LOADS"—that is, loads in which the service required is to operate mechanism up to a certain point and then to exert full mechanical pressure to hold it there—are sometimes a difficult problem. The ordinary type of motor is inadmissible because, unlike a steam engine, a hydraulic ram or a compressed air device, it cannot "pull up and stand" under its load. In this the motor resembles an internal combustion engine; it can exert power only while it is running. The reason is that the revolution of the armature or rotor generates a "back-voltage" which opposes that of the supply and permits only enough current to flow to make up for the load. If completely stalled, therefore, it generates no back-voltage and the current rises to an excessive amount which will quickly destroy the motor windings unless the fuse blows promptly. There are, however, two chief methods by which "stalling loads" may be handled electrically, and we will consider their comparative advantages with those of each other and of mechanical means of accomplishing the same purpose, the latter being taken first.



Automatic gate closing mechanism on an elevator powered by torque motor (Courtesy The Otis Elevator Co., New York City)

Steam-Driven Rams

These fulfill the required operating conditions excellently. They are, however, subject to certain limitations from a practical standpoint. One of these is the high initial cost of the ram itself and its accessories—which is usually considerably higher than that of an electrically-operated equivalent. Moreover, the operating cost is almost always high when the device is used intermittently because of the loss of power through condensation during non-use periods. The steam pressure must be constantly maintained ready for use; whereas an electrical device uses no power when the current is shut off. The installation cost of piping is another feature which must be considered compared with that of electric wires and conduit when steam power is contrasted with electric. From a maintenance standpoint, the renewal of packings, and the risk of condensed water freezing in the piping or ram must also be taken into account. Nevertheless, in plants where extra steam power is already available, rams of this type are extensively used.

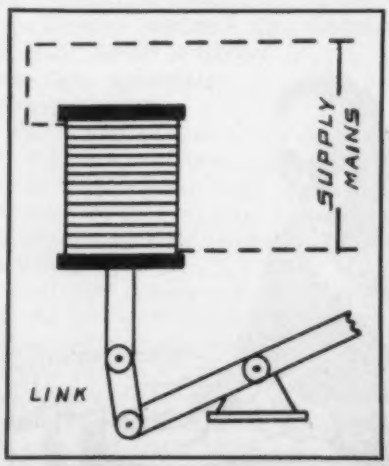


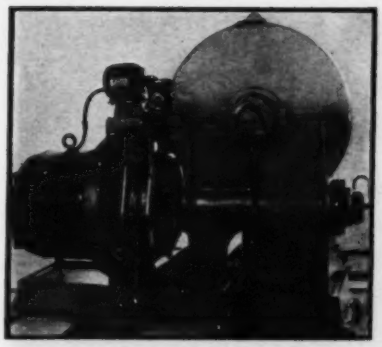
Diagram of Solenoid (Courtesy The Ohio Electric Mfg. Co., Cleveland, O.)

Hydraulic and Air-Driven Rams

Much the same advantages and objections apply to air and hydraulic rams; for even where air is used it is not unusual to find considerable condensed water in the piping—as anyone who has started to clean a motor with compressed air without first "blowing off" the line knows to his cost. However, although an accumulator or an air-receiver may be used to store pressure (and thus avoid the need for the pump or compressor to run continuously), the initial, operating and maintenance costs tend to be somewhat higher than for electrical devices of equal stroke and power.

Solenoids

The solenoid is an electrically-operated device consisting of a movable iron core (which must be laminated if for use on alternating current), and a hollow coil into which the core is sucked by the magnetic effect of the current in the coil. The solenoid is reliable and positive both in movement and in carrying the "stalling load"; but it is subject to some decided limitations on account of the basic laws of magnetism—viz., the pull varies inversely as the square of the distance between the magnetic centers of the coil and the core. The pull, therefore, varies greatly at different points of the stroke. At its beginning, it is comparatively weak. It rises rapidly to a maximum as the core nears the coil's center, at which point the attraction becomes so great that the mo-



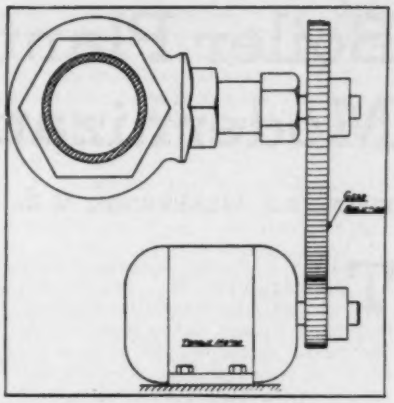
Brake drum control mechanism. Brake operated by torque motor (Courtesy Kimball Bros., Council Bluffs, Iowa)

tion is arrested. To take a practical case, a certain type of high-class solenoid has the following approximate pulls at various distances of travel.

12 in. travel,	60 lb. pull
8 in. "	100 " "
3½ in. "	150 " "
1 in. "	215 " "

The acceleration of the core is exceedingly rapid, and the device therefore exhibits a tendency to "slam" unless a dashpot or other "slowing-up" attachment is provided. The wear is also apt to require careful attention on account of the wide pull-variation produced by very small maladjustments of the link system which transmits the force to the driven mechanism. For moderate travels up to a few inches, however, the solenoid is widely used. Above that amount the size, weight and cost of a solenoid increase so rapidly that they become almost prohibitive. The solenoid from which the figures just mentioned were taken was 16" high and 13" square, and weighed around 400 lbs. Another point to be noted is that a solenoid, especially if on alternating current, is apt to be rather noisy in operation.

Where longer travels are involved the solenoid is not conveniently adaptable, particularly where the pull or thrust must be practically constant over the greater part of the stroke ending up with the exertion of full pressure at the "stalling" end. There is also difficulty where the force must be reversed in direction, as for example in the opening and closing of elevator safety gates. A solenoid is inherently irreversible in action, since reversing the current in the coil has no effect on the direction of the pull. Thus about the only practical ways of making a solenoid reverse are: either to have two coils, each capable of giving the full required pull and being set to act on the core in opposite directions alternately; or else to compel the core to pull against a spring in one direction and allow the spring to return it in the other. This latter method means of course that in order to have a 100-lb. pull in both directions the spring must exert 100 lbs. pressure and the solenoid must produce 200 lb. It must therefore in either case be much larger than a regular 100-lb. type for one-way operation. Hence, as a rule, such long travel or reversing movements are best handled by a "torque motor" either driving direct or through a speed reducer as may be most desirable to fit the particular case.



Valve operated by torque motor

Torque Motors

A torque motor is a special type of motor, standardized in various sizes and so built that it behaves like an ordinary motor while moving the mechanism it drives; but which, when it is stalled at the end of the stroke, exerts enough back-voltage or opposing effect to the supply voltage to hold the current down to full load and thus produces full load torque. This torque is translated by suitable means into the required lineal travel and final stalled pressure. How long it can remain thus stalled depends on the motor's "stalling rating." Some ratings can only be stalled for five or ten minutes during each hour, while others will withstand this treatment for many hours at a time without overheating or injury. By the use of the torque motor there are no practical limitations as to the length of lineal travel. Since the motor can be readily reversed it need only exert full load torque instead of twice that power as in the spring-controlled reversing solenoid. Its smaller size for the longer travel will also often effect a substantial saving in installation and first cost, and its maintenance is as low as that of an ordinary motor. In action, it is perhaps slightly less rapid than the "slam-bang" operation of a solenoid; but the difference is small, and the reduced wear and maintenance, and the quiet functioning, make it in many cases more desirable. This is especially true if it is located in a spot difficult of access for inspection and adjustment.

Among other suggested applications of torque motors in the paper mill may be mentioned the remote control of steam, gas and fire-protection lines; opening and closing of brakes on the brake drums of cranes and hoists; and various auxiliary equipment such as the clamping attachment employed on one type of radial drill for locking the swinging arm electrically. This is chiefly useful in the repair shop because it permits faster work on hurry-up jobs. For the elevator gate closing mechanism already mentioned, the comparatively long travel and the need for reversibility render the torque motor decidedly preferable to a solenoid. In fact, a number of freight and passenger elevator makers have adopted these motors as standard equipment. For remote control of steam and fire-protection lines, either solenoids or torque motors can be used. As, however, a solenoid-operated valve must be of the needle or plunger type, whereas the more powerful and positive rotary screw valve may be used if a torque motor is employed, the advantage would appear to be in favor of the latter, especially if large valves and high pressures must be controlled. The cost, too, is apt to be lower than with a solenoid. For operating the heating systems of oil or gas-fired cookers, drying equipment, or for general heating purposes, it is evident that the screw-type valve permits intermediate adjustments which give closer temperature control. The same applies to process steam lines also. Operation of automatic remote-control switchgear sequences, as for stuff-pumps, blowers, etc. offers another possibility for torque motors because their action is smoother than solenoids, and very quiet. For crane and hoist brake drum work, this smoother action permits very close control of the brake release when the load must be "inched" up or down.

◆ National Safety Congress Returns to Chicago

Twenty-five years ago, in the city of Chicago, two men in a tiny office started a movement, the supreme purpose of which was the prevention of accidents and the conservation of human life. On October 10-14, 1938, thousands of men and women will gather at the world's largest hotel, The Stevens, in the mid-west metropolis, ready to add greater impetus to that movement—living testimony to the worth of the purpose—as the National Safety Council once again convenes in the city of its birth.

It has been five years since the Safety Congress met in Chicago. In 1933, when the world was marvelling at the Century of Progress and the Windy City's streets resounded with the tramp of marching Legionnaires, the Congress was, perhaps, made more striking in its import and the reason for its being, but it is, nevertheless, probably more fitting that the convention next year, celebrating the Council's Silver Anniversary, should be held in the city which watched it grow into national importance.

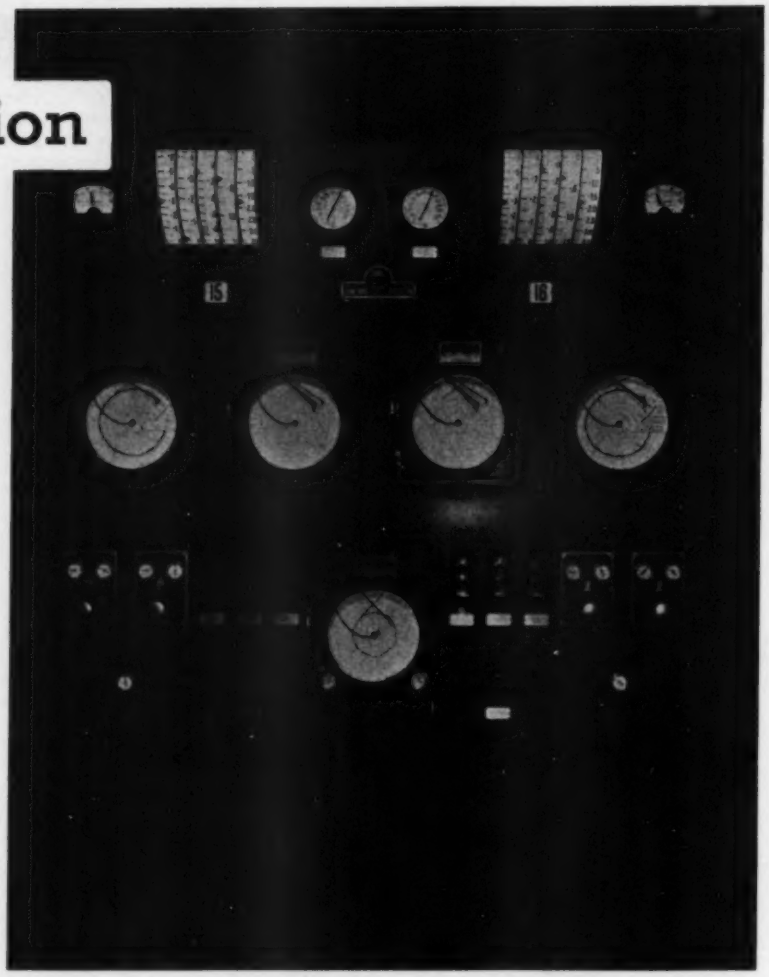
The 1937 Congress, held in Kansas City, October 11-15, attracted more than 8,000 delegates from the United States and several foreign countries and more than 40,000 square feet of floor space was required to accommodate the safety exhibits that are a feature of every Congress. The coming Congress, which will cover every conceivable phase of safety, will be the sixth to be held in Chicago, the previous years being 1914, 1927, 1929, 1931 and 1933.

Boiler Plant Modernization

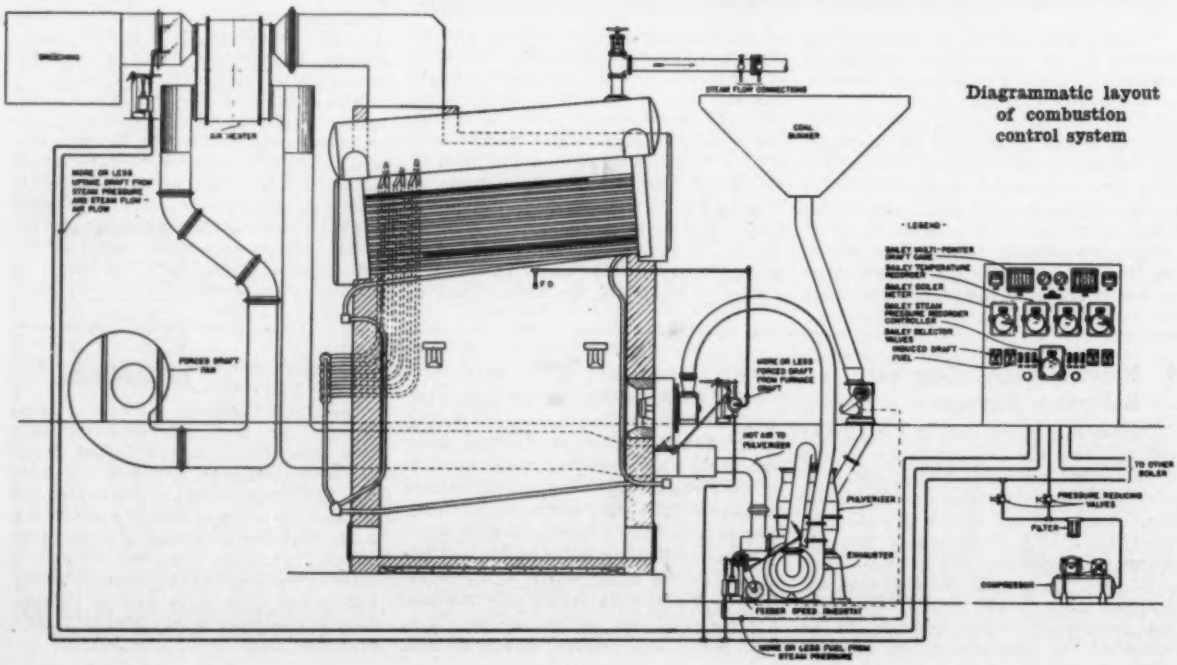
FRANCIS A. WESTBROOK, M. E.

THE S. D. Warren Company of Cumberland Mills, Me., has recently completed the installation of pulverized coal equipment on two Heine boilers. The normal output of these units is 80,000 lb. of steam per hour. The two boilers are set in battery with water walls front and rear and slag screen at bottom of furnace. Combustion Engineering Company, Size 362, bowl mills with independent coal feeders were selected for the installation, and they are giving excellent service with uniform pulverization and a minimum of maintenance. Each furnace has a Type R. Lopulco burner with air regulators integral with burner. Exit gases pass through a Ljungstrom Air preheater equipped with 27½-inch high heating elements, each heater having a heating surface of 4,000 sq. ft. Soot blowers are provided for periodic cleaning of the preheater elements. Secondary air for burners and primary air for pulverizers is supplied by a Green forced draft fan, having a capacity of 28,800 cu. ft. of air per minute. This air is heated to approximately 450 degrees Fahr. in the preheater before delivery to the burners and is tempered down to 150 deg. Fahr. for primary air to pulverizers.

Bailey Meter Company automatic combustion control equipment completes the installation. The control instruments and gauges of this set up are conveniently located on a panel board directly in front



Control instrument panel board



Diagrammatic layout of combustion control system

of the boilers. The accompanying diagram shows the general layout of piping and controllers.

The master controller is connected to the main steam header, its operating mechanism actuates an air pilot valve which is supplied with compressed air at 35 lb. pressure. Changes in steam actuate this master air pilot valve to increase or decrease the air pressure in the outlet line (loading pressure). This loading pressure is transmitted through the Standatrol and the Master Selector valve to each boiler control instrument, where it is directed through two different paths, through the uptake draft Selector valve. One path is to the averaging relay, thence to the uptake damper control. The other path is through the fuel feed Selector valve to the feed control drive.

From the description above it is apparent that fuel and air are changed simultaneously with a change in rate of steaming to maintain steam pressure. After the change in rate of fuel and air supply has been made, it may be necessary to readjust the air slightly to maintain the correct fuel-air ratio for efficient combustion. This is accomplished by means of the Bailey boiler meter, a pilot valve in this instrument being actuated only when the motion of the steam flow pen and that of the air flow pen are not of equal amounts. As long as the records coincide and do not separate, best combustion conditions prevail, and the pilot valve remains in its neutral position. A variation of less than 1 per cent CO_2 is obtained in the steaming range of the boiler. Furnace draft is maintained automatically by means of control drives on the wind box dampers. The boiler panel contains multiple draft gauges for indicating draft in furnace, entering and leaving preheater, burner case and main air duct. There also are steam flow charts and temperature records of gases entering and leaving preheater as well as the temperature of air as supplied to the burners.

When the automatic control is not desired a simple turn of a switch valve on the Selector places the entire control system under manual control for base load operation. Convenient control knobs on each Selector valve control the fuel feed and air flow.

In addition to these two new pulverized coal units the company has fourteen other boilers, eight of which are fired with pulverized fuel manually controlled and six stoker fired, four of these being used only as standby units. The stoker units are operated with damper control on the forced draft system, actuated by variations of steam header pressure.

Thus it will be seen that steam regulation can be obtained either with stoker fired boilers when they are in service or with the new installation described above. This arrangement gives a high degree of flexibility with most efficient and economical operation.

◆ Crown Willamette's New Reinforced Concrete Tank

Construction of a reinforced concrete filtered water storage tank of 1,500,000-gallon capacity to serve the Crown Willamette mill of the Crown-Zellerbach Corporation at Camas, Wash., has been completed by the Austin Company.

Under the patented Hewitt system, the tank walls were constructed in vertical sections. Particularly interesting were the sequence and method of applying this system to the job.

The site, on a heavily-wooded hillside, was cleared, excavation completed and the concrete foundation ring and floor then poured. Then an inside form 1/7 of inside circumference of the tank was constructed. This form was braced back to a kingpin in the center of the floor and was constructed on rollers. Sectional forms for the exterior of the tank were built up so that they might be readily handled from a traveling A-frame, which ran on a track provided at the top of the tank on the movable form section. The inside movable form was pulled away from the wall by a chain block when the concrete had set in a completed section and then rolled to the next position. A movement toward the center of the tank of approximately 4 inches was provided for by a slot in the horizontal bracing connecting the form to the king-pin. Accuracy in establishing the proper position of the inside form was assured by its position with respect to the king-pin and slot, as well as by a line scribed on the floor of the tank.

The situation on a hillside was capitalized by engineers laying out the job, as they placed the mixer unit on the high side of the tank and maintained a system of runways which were shifted as construction progressed. In pouring the dome, they utilized a spiral runway that worked its way up the sides of the dome as it circled around it.

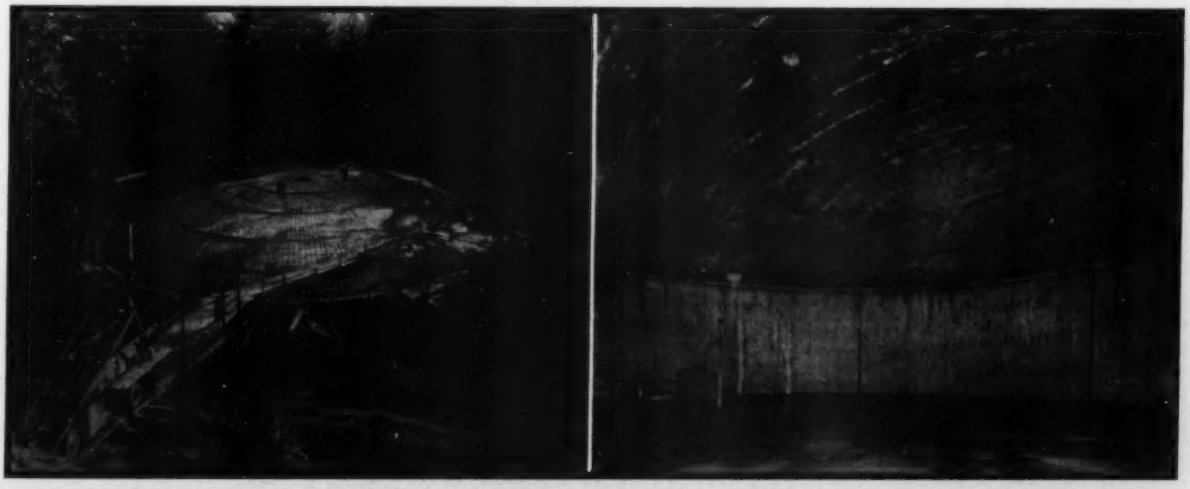
The tank is 24 feet high at the side walls and 36 feet in the center and has an inside diameter of 106 feet. A total of 1,200 barrels of cement was employed on the job.

◆ William P. Wagner

William P. Wagner, president and co-founder of Northern Paper Mills, Green Bay, Wis., passed away November 13 at the age of 78. He had been president of the Northern company for almost 30 years.

Mr. Wagner, together with the late Michael McCormick, founded the Northern Paper Mills in 1901 and became vice-president. Mr. McCormick died in 1907 and in 1908 Mr. Wagner became president of the company. In addition to his association in the paper industry, Mr. Wagner was also connected with various banking institutions. He was president of the Citizens National Bank until 1921, at which time he resigned in order to devote his full time to the paper business. He was also instrumental in founding many other banks in Wisconsin and Illinois.

In addition to his widow, Mr. Wagner is survived by two sons and a daughter. Funeral services were held at the Union Congregational Church in Green Bay.



Left—Water storage tank in process of construction at Camas, Wash., plant of Crown Willamette Paper Co.
Right—Inside view of tank. (Photos courtesy The Austin Co.)

Efficient Pulp Mill Power Plant

This 3125 kv.-a., 80% P. F., 2500 kw., 3-phase, 2500 volt, 60 cycle unit located in power house turbine room

B. L. KERNS, Central Station Div.
Westinghouse Electric & Mfg. Co.

THE modern trend in power plant practice employing high pressure steam with back pressure turbines in a modern 200-ton unbleached pulp mill was recently exemplified by the Weyerhaeuser Timber Company, at Everett, Washington, where the production of steam and electric power is synchronized to meet the demands of the various departments of the pulp mill. In the laying out and designing of the power plant the relative timing of peak demands for steam and electric energy were taken into consideration and a balanced efficient system was worked out for meeting them by the consulting engineer in charge, O. C. Schoenwerk.

Briefly, the new power plant consists of two 4-drum Sterling type Babcock and Wilcox boilers designed to operate at a pressure of 600 lb. per sq. inch, 200 degrees superheat, or approximately 700 deg. Fahr. TT and using as fuel primarily hogged wood waste from the wood room, breakdown and chipping plants, burned in efficiently designed Dutch ovens. As a precautionary measure, each boiler is equipped with four oil burners for the use of oil in case of failure of the hogged fuel supply.

The thermal efficiency of this steam plant is increased by the use of water-cooled grates and water-cooled side walls; forced draft fans pass air through the tubular air preheaters where it is heated to approximately 550 deg. Fahr. thence into the boilers. Induced draft fans draw the stack gasses through a cinder catcher before exhausting into the concrete stack. The capacity of the plant is about 2,400,000 lb. of water evaporated every 24 hours.

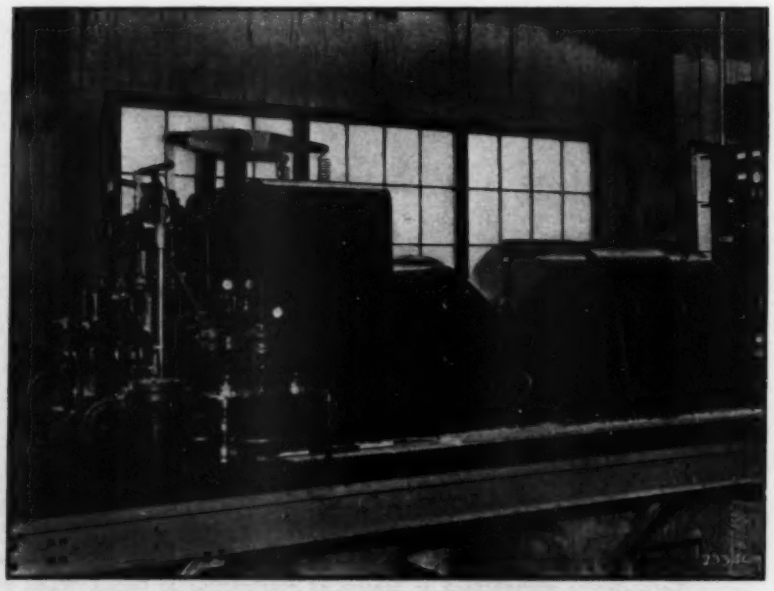
A 200-ton pulp mill requires for cooking and drying approximately 120,000 lb. of steam per hour, pressures for cooking being from 80 to 120 lb. gauge and for drying 20 to 35 lb. gauge. The electric power requirements for serving the total approximate 3000 kw. in electric energy.

With these above steam and power requirements as a basis, two turbine generator units of the proper rating and design characteristics were installed to operate under the present conditions applying. The first turbine generator located in the power plant is rated 3125 kv.-a., 80 per cent power factor, 2500 kw., equipped with a direct-connected exciter and an air cooler. The turbine is designed for a total steam inlet pressure of 570 lb. at the throttle with approximately 200 degrees superheat and exhausts at from 180 to 225 lb. pressure, 130 degrees superheat into the exhaust line serving the digester building and machine room. This turbine is equipped with a back pressure regulator and other standard accessories. The entire output of the two boilers passes through this turbine.

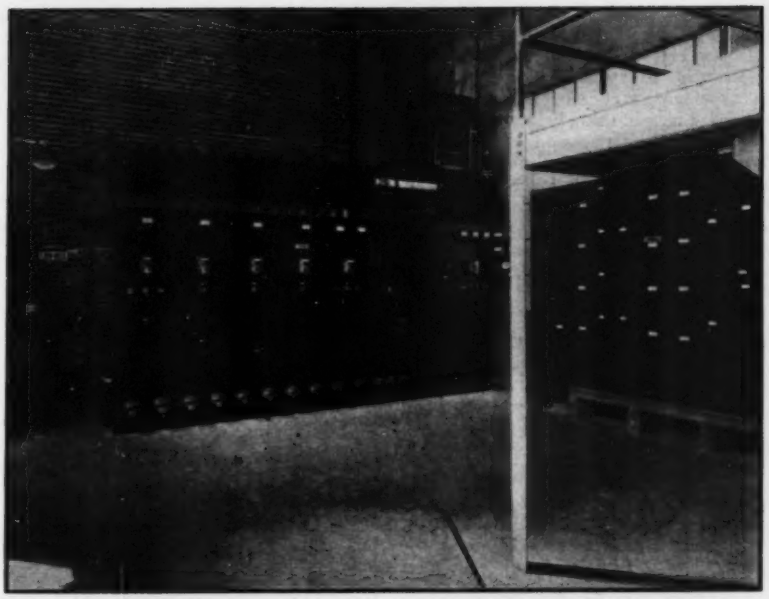
The second turbine generator unit is located in the machine room 1400-ft. distant from the power plant. It is rated 1250 kv.-a., 80 per cent power factor, 1000 kw. designed for a normal inlet pressure at throttle of 570 lb. gauge and to exhaust at from 20 to 35 lb. gauge back pressure into the exhaust line connecting to the dryer header of the pulp drying machine. This turbine is also equipped with a back pressure regulator and air cooler and obtains excitation from a 3-unit No. G exciter set located in the machine room.

Both turbine generators are wound for 3 phase 60 cycle 2400 volts and are tied together through the use of an outside mill bus feeder pole line which serves all of the different mill units. Voltage regulators are located on each of the generator switchboard panels and the switchboard equipment provides also the usual outgoing feeder panels serving each of the different plant units.

Both turbines exhaust directly into the



1250 kv.-a., 1000 kw., 3-phase, 60 cycle, 2400 volt turbine generator unit



Switchboard for main power house turbine generator, outgoing feeder panels, and incoming outside power panel

steam process lines and with the steam admission into the turbines controlled by back pressure regulators there is therefore no direct control of the generator load since it is entirely dependent upon the process steam requirements of this plant. As a balance, therefore, to meet the unusual power load demands and also for good regulation, an auxiliary source of power supply to the mill is obtained through an 11 KV connection to the local Puget Sound Power and Light Company's line nearby.

◆ All-Steel Barge for Hauling Wood Pulp

A giant welded all-steel barge, measuring 255 feet by 40 feet by 14 feet, has been built and launched by the Dravo Corporation at their Wilmington, Del., shipyards. The barge was built for the Kieckhefer Container Company, Delair, N. J., and will be used to haul baled wood pulp from Plymouth, N. C., to Delair, N. J. This is the first steel barge to be designed for this kind of inland water service. The barge has a capacity of 888 bales or 2,000 net tons of wood pulp.

◆ Rollway Bearing Increases Production Facilities

The Rollway Bearing Company, Inc., of Syracuse, N. Y., in order to meet the increasing demands of the paper industry for antifriction bearings, has just completed an expansion of plant and engineering facilities which will not only extend volume, but give greater flexibility in manufacturing with even more rapid deliveries. Extensive modernizing improvements to the plant are being completed, new, up-to-date production machinery has been installed and additional equipment and facilities added in the Heat Treating, Precision Grinding and Inspection departments.

Having from the first, stressed its ability to build special bearings for special applications, its new set-up, the Rollway Bearing Company officials claim, has further strengthened its stand in this respect. They are prepared, they say, to manufacture special housings for papermaking machinery to include Rollway bearings and to furnish these housings with bearings as a unit, to the paper mill trade. This eliminates a major problem of the plant engineer who previously has, himself, had to wrestle with the task of adapting bearings to his machinery and to existing housings.

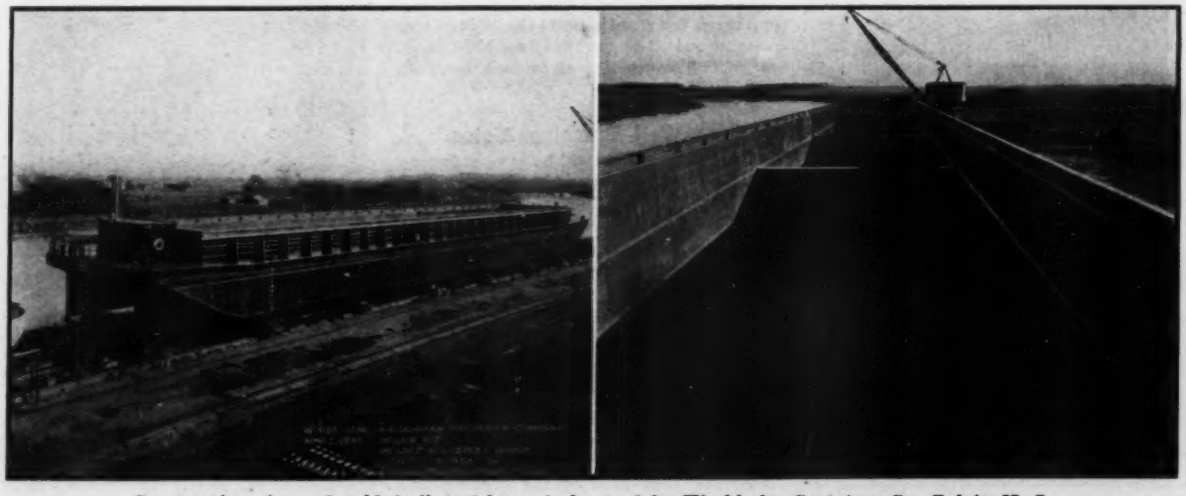
Rollway bearings are recommended by the company's engineers for installations on grinders, Jordans, both felt and motor driven; breast rolls, press rolls, dryer rolls, calender rolls, cylinder moulds and couch rolls.

◆ Arthur Green Speaks Before Conn. Supers

The regular fall meeting of the Connecticut Valley division of the American Pulp and Paper Mill Superintendents Association was held in Greenfield, Mass., recently. A considerable number of members attended the meeting, attracted by two papers on subjects of importance. These topics were: "Some Fundamentals of Beating and Refining" by Arthur B. Green, consulting engineer, and a brief on the outline of some of the pumping troubles in paper mills by J. G. Rearick of the Warren Steam Pump Company.

◆ Commence Operations at Kieckhefer Mill

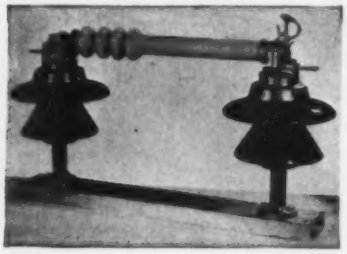
The new $4,000,000 mill of the Kieckhefer Container Corporation at Plymouth, N. C., has commenced operations and is grinding pulp for shipment to mills at Delair, N. J. and Three Rivers, Mich. The mill will use 400 cords of pulpwood daily. It has a capacity of 300 tons.



Construction views of welded all-steel barge to be used by Kieckhefer Container Co., Delair, N. J.

◆ Power Fuse

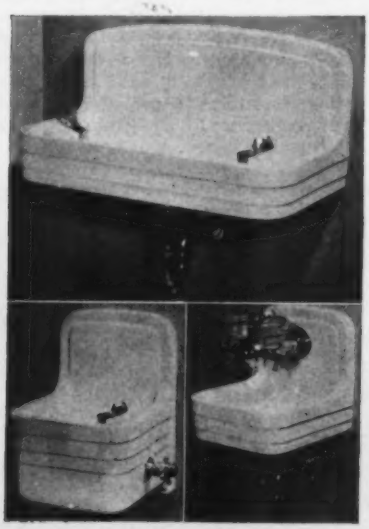
A 34.5 kv., 200 ampere disconnecting type BA "De-ion" power fuse has been announced by the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., for service in medium capacity generating stations and substations where the short circuit capacity does not exceed 600,000-3 phase kva. The fuse is hinged at the lower contact to open approximately 75 degrees for use as a



disconnecting switch that can be operated by a standard hookstick. Magnetizing currents of a 750 kva., three-phase transformer are interrupted easily by using this fuse as a disconnect. The fuse also can be lowered to the ground for inspection or refilling. Complete operation of removing fuse from service, refilling and restoring service is stated by the manufacturer to be accomplished in less than one minute of time.

◆ Modernistic Drinking Fountains

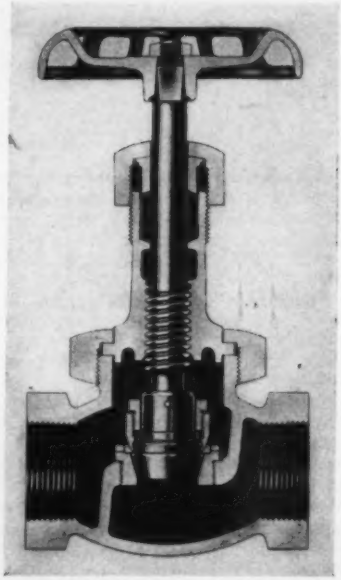
The Crane Company, 836 South Michigan Ave., Chicago, Ill., has brought out six new models of vitreous china drinking fountains. Three of these models constitute the Erie line; a fourth the Ontario; and the remaining two, the Oasis.



One model of the Erie line has an integral strainer and is equipped with two bubblers, automatic stream regulators, and improved self-closing valves and loose key stops. The other Erie fountains include a single bubbler with a push-button, and self-closing ice water faucet; and a combination bubbler and ice water faucet with glass receptor. The Ontario model has two bubblers and is similar to the Erie line except that it is of the roll rim type supported on brackets rather than of the pedestal type. The Oasis models have the supply and waste fittings concealed in a housing and have vitreous china backs, one eight inches high, the other fifteen inches. Likewise, either of the fountains can be had with ice water faucets if desired. In all instances, bubblers are located above the rim to avoid back-siphonage.

◆ Plug-Seat Valve

A plug-seat valve in which the plug and seat-ring is made of stainless steel with a Brinnell hardness in excess of 500 has been developed by Jenkins Bros., 80 White Street, New York. This valve is designated as Fig. 976; the metal used for its plug and seat-ring as Jenkins JX500. The valve is specially recommended by the manufacturer for use on any steam line where close regulation is required, for continuous throttling for pressure reduction, and for free blow duty on soot blowers, injectors and heating coils.



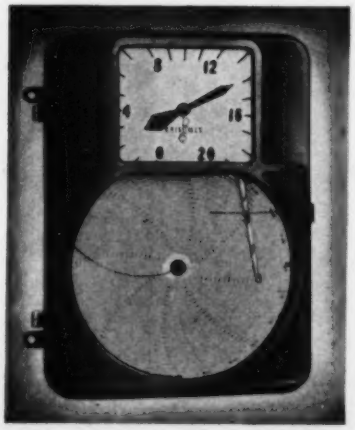
◆ Deep-Well Pumping Motor

A new line of vertical hollow-shaft motors for deep-well pumping service has been developed by General Electric Company, Schenectady, N. Y. In this line, the oiling housing of each motor is located in the top end-shield and is divided into two parts by a cylindrical wall which supports the outer race of the thrust bearing. An inner compartment, containing the thrust bearing, is connected to the outer by a small metering hole protected by an oil screen. Oil flow into the inner bearing cavity, when the motor is at rest, until the oil level is equal to the height of the oil in the outer compartment or reservoir, thus flooding the bearing and protecting it against rusting in idle periods. As soon as the motor starts to rotate, the pumping action of the ball bearings begin to clear the inner housing of excess oil and, by the time full speed is reached, the rate of lubrication is regulated by the rate of oil flow through the metering hole and is independent of the

motor's operating speed. Each motor of the line also utilizes a system of double-end ventilation in which cooling air is drawn in under the top cover and through side openings in the motor base. The air cools the coil ends and punchings and then blows out through discharge openings in the stator frame.

◆ Recording and Indicating Potentiometer Pyrometer

A potentiometer pyrometer, designated as Bristol's Indicating Recording Pyromaster, has been developed by The Bristol Company, Waterbury, Conn., for

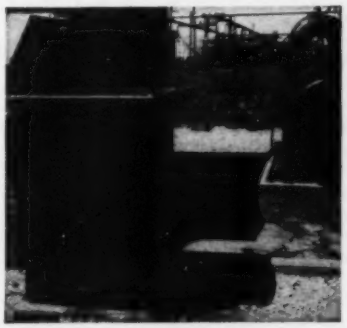


recording and indicating thermocouple temperatures. The instrument provides for direct marking on a 12-in. round chart and for scale indication on a dial. Its operating mechanism consists of a highly dampened sensitive galvanometer, which is pivoted in jewel bearings; a special relay unit; a standardizing unit; a "power pack"; and the potentiometer or recording and indicating units. The special relay unit, actuated by the galvanometer, oper-

ates a motor that balances the electromotive force from the thermocouple and positions the recording pen arm and scale indicator.

◆ High Voltage Explosion-Proof Linestarter

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has announced the development of a completely oil immersed and corrosion resisting linestarter to meet requirements of hazardous applications. This starter, designated as type DNO, for starting



squirrel-cage and wound rotor induction motors, is available for 2200 and 4600 volt service. For three pole, 60, 50, 40 or 25 cycle power, its maximum rating is 700 hp. for 2200 volts and 1250 hp. for 4600 volts. The internal assembly, the same for either a floor mounted or frame mounted starter, consists essentially of a main switch with its operating mechanism and auxiliaries, an operating transformer, current transformers and overload relays. The starter is operated by a special two button oil-immersed push button station.

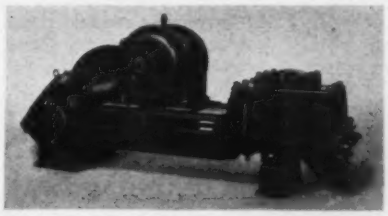
◆ Electric Heaters Improve Paper Box Waterproofing

Strip heaters of 500 watt capacity and of General Electric design are being used by the Pharmacy Paper Box Company, Chicago, Ill., in the manufacture of paper-

board boxes for the display and delivery of fish and sea food. These heaters, four of them under a paraffin container, keep the paraffin at proper temperature for giving the boxes a smooth, waterproof coat and eliminate the danger of burning the paraffin.

◆ Duplex Power Pump

Fairbanks, Morse & Co., 900 South Wabash Ave., Chicago, has developed a duplex power pump for fire protection and for general service applications. This pump, designated as F-M Fig. 6130, is offered with a fluid end piston stroke of



10 inches and with cylinder diameters of 2½ to 5 inches. Its capacity range is from 40 to 187 U. S. gallons per minute at pressures from 250 to 800 pounds per square inch. The pump can be furnished alone, with pulley for belt drive, or with top-mounted F-M motor and silent chain drive.

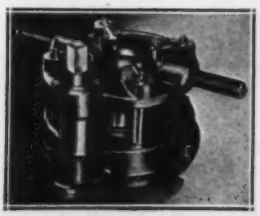
◆ Pyrometer Development

A color pyrometer, the design of which is based on the use of light filters and color wedges which are transparent to a number of colors simultaneously, is being manufactured by The Pyrometer Instrument Co., 103-105 Lafayette St., New York. The instrument, known as the

PYRO Bi-Optical Pyrometer, is furnished with scale ranges from about 900-1900 deg. Cent. or 1700-3500 deg. Fahr. and is stated to be the only instrument for technical and scientific measurements by which the temperature of the "black body" and the "actual" temperature may be ascertained simultaneously.

◆ Pipe Threader

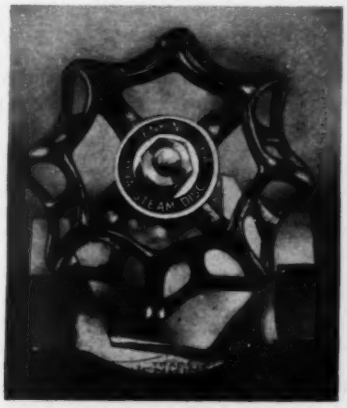
Beaver Pipe Tools, Inc., Warren, Ohio, has added a new pipe threader to its Beaver line of equipment. This tool,



designated as No. 48-R, is designed for cutting right-hand tapered threads only (American Briggs Standard) on 2½, 3, 3½ and 4-inch pipe. It makes use of extra wide dies. There is a separate set for each pipe size. Each die is held in position by a fully-enclosed spring-backed ball. Other features of the threader include fully-enclosed gears, a straddle-mounted driving pinion with a bearing both above and below the gear teeth, and a guide for the accurate setting of the dies.

◆ Improvements in Valve Line

Jenkins Bros., 80 White Street, New York, has announced three new developments in its line of standard bronze valves. One of these developments covers a handwheel; another, an index plate; and the third, a renewable composition disc. The handwheel, with an unusually large gripping area for its size, has a deeply depressed center to prevent the hand from touching a hot wheel nut. The index plate which is held in the depressed center of the wheel by the wheel nut, gives the figure numbers of the valve as



well as the disc number and service to aid in ordering replacements. The renewable composition disc, stated by the manufacturer to have unheard-of life in steam service and believed by the manufacturer to be the nearest to a universal disc that has ever been developed, replaces disc No. 119 under the designation No. 119-A.

◆ AN ADDITIONAL USE FOR PAPER has been revealed in the creation of a paper cup dispenser for home use, by the Dixie-Vortex Company. This dispenser, which was announced during the summer, is colored egg-shell white and blue and contains twenty-five paper cups, which may be released from the dispenser one at a time, upon removal of the Cellophane wrapping at the bottom. A tab at the top provides for fastening to a wall.

◆ THE NATIONAL HOUSING GUILD, sponsored by Johns-Manville, has recently issued the first edition of a new publication, "The Guild Spokesman." Its purpose is to serve as a medium through which members, member companies and prospective members can co-operate in an exchange of ideas, opinions and experiences in relation to consumer selling in the building industry.

Paper Production Rise Over 1936 Peak at Slower Rate

The information on this page is quoted from a survey of the paper industry recently published by Dun & Bradstreet, Inc.—Editors Note.

HESITANCY, which has permeated many trade divisions exerted a lighter retardative influence on the paper industry. Even though operations have slackened in some branches since Summer, production for the ten months remained by a narrow range above the peak of the corresponding 1936 period. Because of the rush to place orders last Spring, buying in wholesale markets also contracted from first-quarter proportions, but exceeded the 1936 volume. With both mills and wholesalers, there was more recession in coarse papers than in fine papers and newsprint.

Going 12.4 per cent over the 1929 peak of 3,406,552 short tons, newsprint production in the United States and Canada for the ten months of 1937 established a new record at 3,828,271 tons, according to the News Print Service Bureau. This exceeded the annual production of every year from 1930 to 1935, inclusive. Despite the restricted flow of new orders since early Fall, manufacturers estimated the 1937 production of paper and paper-board at 12,575,000 tons, or about 5 per cent ahead of the 1936 all-time high, computed at 11,975,552 tons by the Bureau of Census.

Reopening of closed plants, starting long-idle machines, and speeding up existing ones provided the increased productive capacity for the newsprint division, as no additional plants were constructed. At other mills, production facilities were enlarged about 10 per cent this year by rehabilitation and building programs. Price structure generally was firm, with production curtailment planned to maintain steadiness.

Mill Schedules Reduced

Production in both the fine and coarse paper divisions of the industry was curtailed abruptly in August, and by October the contraction became tighter. Mills operating formerly on a six-day basis dropped to five or four days a week on lowered daily schedules. From a jump of 15 per cent for the first five months over the 1936 peak, the recession after June left the October rate of output under last year's. This cut the production gain over the ten months of 1936 to 5 to 15 from 10 to 30 per cent for the first quarter.

No slowing of newsprint output became evident until October. As a result of the recently-initiated curtailment program, October production of 392,946 tons for the United States and Canada was only 2.8 per cent more than the 382,172 for October, 1936. This was the smallest year-to-year gain in twenty-two months. Each of the ten months of 1937, however, marked a new high for the period. In an unbroken rise from April, August production reached 399,024 tons, the largest monthly total in the history of the industry.

With five new highs attained during the period, combined newsprint production of the United States and Canada for the ten months of 1937, amounted to 3,828,271 short tons. This total surpassed every corresponding one in the tabulation of the News Print Service Bureau. It went 13.8 per cent over the 1936 ten-month output of 3,364,510 tons, 27.4 per cent over 1935, 31.0 over 1934, and 57.9 per cent over the 1933 low. The ten-month peak of 3,406,552 tons, which has been unmatched since 1929, was topped by 12.4 per cent.

Wholesale Orders Fewer

Spring bulge in orders to wholesalers of paper was built on a temporary shortage of pulp, rising prices, and imminent delivery delays, as labor outbreaks spread. With more pulp available and prices steadied, orders started to slacken. In some divisions, the Summer recession was deeper and more prolonged than usual, and inventories were heavier than for the corresponding period of the year preceding. Orders for paper specialties increased during the Summer, running from 10 to 15 per cent beyond the 1936 volume.

Instead of a year-to-year spread of 15 to 40 per cent recorded for the first quarter, the irregular downtrend after May had shortened the rise in wholesale orders for the ten months of 1937 to a range of 10 to 20 per cent from the 1936 volume. Most of this favorable showing was contributed by the larger tonnage. Part of it was due to the moderate price advances and the stronger demand for the better quality merchandise. The percentage of gain was wider in bond and catalogue papers than in the coarser grades.

A few exceptional houses were well occupied through October. The majority of wholesalers, however, reported a marked decline starting in August, which was accentuated during September. As a result, orders for the third quarter lagged 2 to 4 per cent behind the total for the second one. September still was ahead of its 1936 comparative. October orders with many concerns, however, were under the previous year's volume by 3 to 5 per cent.

Newsprint Prices Higher

Upward revisions predominated in wholesale price alterations this year. Two or three narrow mark-ups in the first six months, however, had advanced quotations not more than 5 to 10 per cent from 1936 positions. Most of the increases were on coated, bond, tablet, uncoated white, and some of the book, magazine, gumming, and waxing grades.

During the late Summer, the rise in pulp quotations was halted by growing supply. In October, book paper was reduced about $5 a ton, writing paper turned easier, and most of the coarse grades became steadier. Controversy over the 1938 contract price of newsprint started in September. In the final decisions in October, two prices had been named.

One of the large producers set $48 a short ton for the first half of 1938 and $50 for the last half. The others agreed on $50 for the first half, with the last-half price to be announced later. The $50 represented a rise of $7.50 from the $42.50 for 1937. It was the third rise since 1933, when $40 a ton was the lowest price in thirty years.

More 77-B Applications

From 2 for the twelve months of 1936, the number of 77-B cases listed for paper manufacturers rose to 4 in the ten months of 1937. As 1 application was filed by a wholesaler, the total for the period was 5, the highest since the 12 for 1935. For 1934, the number was 4. Excepting this year's, annual totals were comprised of manufacturers.

Bankruptcies, on the other hand, continued the unchecked downtrend that started in 1933. With 1 manufacturer and 7 wholesalers and retailers, the 8 failures for the ten months were one-half the number for all of 1936, when 16 represented a new low. Average liabilities per failure also declined, dropping to $10,500 from $39,560 in 1936.

Complete insolvency record of the paper industry from 1927 to October, 1937, as compiled by DUN & BRADSTREET, INC., shows:

Paper Manufacturers

Year	Number	Liabilities
1927	9	$2,188,500
1928	7	877,600
1929	10	1,929,200
1930	4	1,371,000
1931	11	2,794,208
1932	9	2,577,451
1933	11	2,262,734
1934	9	894,000
1935	2	166,000
1936	5	529,000
1937*	1	12,000

Paper Wholesalers and Retailers

Year	Number	Liabilities
1927	20	$1,130,796
1928	24	570,807
1929	17	267,592
1930	14	210,300
1931	26	515,808
1932	33	936,347
1933	17	523,870
1934	16	333,000

Year	Number	Liabilities
1935.....	18	204,000
1936.....	11	104,000
1937*.....	7	72,000

(*) January to October, inclusive.

These statistics of failures in the paper industry are exclusive of applications under Section 77-B. From June 7, 1934, when Section 77-B of the New Bankruptcy Act became effective, to November 4, 1937, applications were filed by 24 manufacturers and by 1 wholesaler.

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◆ Empire State TAPPI Holds Fall Meeting in Syracuse

Syracuse University, Syracuse, N. Y., was the scene of the regular fall meeting of the Empire State Provisional section of TAPPI, on November 13. The meeting consisted of a luncheon at the College followed by an inspection of the new pulp and paper laboratory building of the New York State College of Forestry.

The technical session of the meeting was given over to a symposiuum on Paper Mill Sanitation and Slime Control at which time Dr. J. R. Sanborn of the New York State Agricultural Experiment Station, Geneva, N. Y., presented a paper on the *Microbiological Problems in the Pulp and Paper Manufacture* and A. E. Griffin, research department, Wallace & Tiernan Co., Newark, N. J., offered a paper on the *Application of the Chloramines for Slime Control.*

Brief talks were given by R. G. Macdonald, secretary of TAPPI, and G. N. Collins, president of the association, at a dinner served at the Hotel Syracuse. W. G. MacNaughton, who was manager of Dr. Herty's Savannah laboratory for two years and who is once again associated with the Newsprint Service Bureau, spoke on *Southern Pine for Groundwood and Newsprint.* Dancing at the hotel completed the program.

◆ Oconto Falls Plant Begins Operations

Operations have been started at the Falls Pulp and Paper Company, Oconto Falls, Wis., following the re-organization of the concern. The mill, which had been closed for seven years, is now headed by Clayton Ewing of Menasha, Wis. Marshall Smith is vice-president and E. W. Forkin is secretary-treasurer.

The digester has been cooking pulp for some time now and first shipments of commercial pulp have already been made. Other departments will be ready to operate as soon as possible. The company is hoping to start its own paper mills soon.

◆ N. Y.-Canadian Supers Meet in Glens Falls, N. Y.

Over 150 members attended the fall meeting of the New York-Canadian division of the American Pulp and Paper Mill Superintendents Association which was held October 29-30 at the Queensbury Hotel, Glens Falls, N. Y. James J. Rogers II, of the J & J Rogers Co., was elected chairman; C. P. Ludington, E. B. Eddy Co., first-vice-chairman; A. J. Loman, Robert Gair Co., second vice-chairman and Lester J. Smith, International Paper Co., secretary-treasurer. A golf tournament, followed by trap and target shooting and a bowling meet, made up the social side of the program.

◆ Ontario Mill Planned by Kimberly-Clark Subsidiary

The Ontario Government has completed arrangements with a company presumed to be the Long Lac Paper Company, a K-C subsidiary, for the construction of a 100-ton sulphite mill at Terrace Bay, five miles east of Schrieber, Ontario, on Lake Superior. The company has received timber cutting rights in the Long Lac area and permission to ship pulpwood to United States mills although the quantity the company will be allowed to export is limited.

◆ Windsor Mill Re-Opens After Eight Year's Idleness

Idle for the past eight years, the Windsor Paper Mill, Inc., New Windsor, N. Y., has once more resumed operations. The decision to open the mill was a re-

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sult of several months of negotiations with the owner, William G. Shortess, who is president of the Liberty Paper Board Company of Steubenville, Ohio. William J. Cassidy and Bert W. Thomas, who have been associated with the Liberty company, are president and treasurer respectively. William T. Cabe is superintendent of mill operations.

All the buildings and machinery have been modernized and reconditioned to produce a lightweight chip and corrugating board. It is expected that the mill will employ about 40 persons on a 24-hour day basis.

◆ New Officers Elected by Northwestern Supers

At a recent meeting of the Northwestern division of the American Pulp and Paper Mill Superintendents Association at Wasau, Wis., S. E. Tomczak, of the Flambeau Paper Co., was chosen chairman; Frank Pelot, Nekoosa-Edwards Paper Co., was elected first vice-president and George Peterson of Mosinee, Wis., was named second vice-president. L. E. Parkinson, Flambeau Paper Co., was elected secretary-treasurer. Main speaker of the session was G. J. Brabender, chemical engineer of the Marathon Paper Mills Co., who read a paper on weight and caliper variation across the paper machine. A motion picture, explaining modern sprinkling systems, was shown at the meeting.

◆ Ontario Paper Plans Barking Mill and Power Plant

The Ontario Paper Company has tentative plans under way for the erection of a new, one-story barking mill in the vicinity of Port Arthur, Ontario. The mill is to be used in conjunction with logging operations in that area.

In addition, the company is reported contemplating the construction of a new power development on the Black River, Heron Bay district, about 175 miles east of Port Arthur. The project would comprise a power dam, hydroelectric generating station, power substation, switching station and transmission line. It is estimated that the development will cost $650,000.

◆ A NEW MILL, said to be for the manufacture of wood pulp and transparent paper, is to be established at Workington in Cumberland, England, according to the local *Cumberland News* which stated that the proposed plant will be backed by a foreign firm. It is expected that the erection of the mill will cost between £500,000 to £750,000.

◆ L. W. WALLACE, head of engineering research for the Association of American Railroads, is now director of the newly-formed division of engineering and research of the Crane Company, Chicago. The new Crane division will comprise the existing division of research and development and the product engineering department of the company.

◆ O. C. SCHOENWERK, now engaged in construction of the Brunswick Pulp and Paper Company's sulphate mill at Brunswick, Ga., has been engaged as engineer for the new mill to be built near Port Arthur, Ontario, by the General Timber Company, affiliated with the Marathon Paper Mills of Rothschild, Wis. Preliminary work has already begun on the Heron Bay site.

◆ Rockford Fibre Container Sold to Southern Kraft

Officials of the Rockford Fibre Container Company, Rockford, Ill., have announced that the factory of the Rockford firm has been sold to the Southern Kraft Corporation for $690,500.

Under the terms of the sale, the manufacture of paper by the Rockford company is to be discontinued and instead of manufacturing a large share of its own paperboard, the company, a branch of the Eddy Paper Corporation, will secure most of its supplies from the Southern Kraft Corporation. Southern Kraft has given the Rockford company a long term lease on all floor space not occupied by the paper mill, operation of which is to cease by January 1.

◆ MANHATTAN RUBBER MFG. DIVISION of Raybestos-Manhattan, Inc., Passaic, N. J., was awarded honorable mention for its industrial trade paper advertising, at the annual convention of the National Industrial Advertisers Association held in Chicago recently.

◆ John McEwan Has New Post with Mohawk Valley

John McEwan, general superintendent of the American Tissue Mills, Holyoke, Mass., has resigned his position to become general manager of the Mohawk Valley Paper Company of Little Falls, N. Y. Mr. McEwan, who is well-known in the paper industry, has been elected to the Mohawk company's board of directors.

◆ Robert B. Parker

Robert B. Parker, president and chairman of the board of the Dwight Brothers Paper Company, Chicago, passed away November 14 at the age of 42. Mr. Parker was a native of Topeka, Kansas, and came to Chicago in 1915. During the World War he served with the 33rd Field Artillery and in 1919 became affiliated with the J. W. Butler Paper Company, which he left in 1933 to head the Dwight company. He is survived by his widow.

◆ Harold Bing

Harold Bing, for many years affiliated with the sales-engineering division of the Sandusky Foundry and Machine Company, Sandusky, Ohio, and more recently associated with the staff of the Beloit Iron Works, Beloit, Wis., passed away December 5 at his home in Sandusky. He was 56 years old.

Known by many as the "roving suction roll ambassador," Mr. Bing had a wide circle of friends throughout the paper industry. He began work with the Sandusky company in 1906 as lathe man and, after completing his apprenticeship, became an all-around machinist. Later, he was sent out in the field as an erecting man and in 1920 was made a member of the sales department of the Sandusky company. He resigned his post as sales-engineer in 1930 to join the staff of the Beloit Iron Works.

Mr. Bing is survived by his widow and three daughters. Officers and old employees of the Sandusky company attended the funeral services in a body.

◆ William R. Sweatt

William R. Sweatt, founder and former head of the Minneapolis-Honeywell Regulator Company, passed away October 12, at the age of 71.

His first company was the Electric Thermostat Company which was formed in Minneapolis in 1885 with Mr. Sweatt as secretary-treasurer. This company later became the Minneapolis-Heat Regulator Company and, in 1927, the Minneapolis-Honeywell Regulator Company. Mr. Sweatt was named president of the company in 1893 and was elected chairman of the board in 1927. Mr. Sweatt was one of the pioneers in the field of automatic controls and control systems for heating, ventilating and air conditioning.

Besides his widow, Mr. Sweatt is survived by two sons and two daughters.

◆ Fred L. Holt

Fred L. Holt, founder and formerly director and treasurer of the Gummed Products Company, Troy, Ohio, died October 29 after an extended illness, at the age of 73.

Mr. Holt was for fifteen years general superintendent of the Nashua Gummed and Coated Paper Company, Nashua, N. H., and was highly regarded as a leader in the gummed products field. Mr. Holt, along with Edward F. Herrlinger and Samuel G. Leitch, was an original partner of the Gummed Products Company, which was founded in 1914.

Mr. Holt is survived by his widow and a sister. Funeral services were held at the Holt residence and burial took place in Riverside Cemetery, Troy.

◆ E. Kenneth Hunt

E. Kenneth Hunt, manager of sales promotion and advertising of the Champion Paper and Fibre Company, Hamilton, Ohio, passed away suddenly October 28, while in attendance at the semi-annual meeting of the Association of National Advertisers at Hot Springs, Virginia.

Mr. Hunt, who had been associated with the Champion company in managerial capacity since 1924, was active in both printing and advertising fields and was a well-known speaker, much in demand among the graphic arts clubs throughout the country.

◆ New Catalogues and Publications

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.—An interesting booklet entitled *Boiler Water Analyses* has been issued recently by this firm. The publication is written as a guide to assist in the understanding of water treatment, the chemical processes involved and their control. It contains many useful formulae and methods of treatment in addition to a price list of chemical solutions necessary. The booklet (No. 5102) gives all the latest standard methods of making boiler water determinations.

American Pulley Co., Philadelphia, Pa.—This company has presented four informative publications. Catalogue P 35 describes the company's steel split pulleys; No. T36 A concerns itself with the firm's various types of hand trucks; No. W36 has to do with the company's wedgebelt drives, and No. MB 37 features the company's tension control motor bases. All four publications contain price lists and specification data and all four are punched for loose-leaf filing. Photographs and diagrams are used to good advantage in all of the bulletins.

Bakelite Corp., New York, N. Y.—A concise description of Bakelite transparent phenolic molding materials is the latest offering of this firm in the form of their bulletin No. 48 of the *Bakelitems* series. The bulletin presents the properties, characteristics and uses of the material and illustrates some of its varied adaptations by means of a natural color photograph.

Bartlett Hayward Division, Koppers Co., Baltimore, Md.—Forty pages long and filled with photographs, specification tables, cross-sectional drawings, in addition to the regular written material, this new bulletin presents and explains the types and uses of the company's self-aligning couplings. Installation views are featured throughout. The bulletin is durably bound and would be a valuable asset in any industrial library.

Benjamin Electric Manufacturing Co., Des Plaines, Ill.—A large de luxe-style catalogue (No. 26) presenting this company's electrical products, is now ready for circulation. Over 300 pages long, this attractive publication is replete with photographs, dimensional tables, drawings and detailed written material illustrating and explaining the uses of the reflectors, floodlights, fittings and sockets, signals and other lighting equipment manufactured by the company. The book is bound with a stiff black and gold cover and is fitted with screw-posts for loose-leaf insertions. Price lists and an alphabetical and numerical index are features of the release.

Cleveland Tramrail, Wickliffe, Ohio—A recent bulletin issued by this company points out the benefits to be derived from a planned materials handling system. Included among the photographs in this release is one showing the manner in which the company's cab controlled crane handles paper rolls.

Cooper Alloy Foundry Co., Elizabeth, N. J.—A new bulletin released by this company lately, illustrates, by means of a series of photographs and brief explanatory written material, the various alloy steel castings manufactured by the Cooper firm. Included in the illustrations is a photograph of a blow valve for use in a sulphite pulp mill.

Dayton-Dowd Co., Quincy, Ill.—A new, fifteen page bulletin (No. 805) illustrating the close-coupled centrifugal pumps manufactured by this company, is now ready for circulation. Details of the pump's construction are explained by written material and photographs, as well as sectional drawings. In addition to the interesting explanatory features regarding the product, there is also incorporated in the bulletin several pages devoted to general pump information and data. The bulletin is punched for loose-leaf filing.

Flexrock Co., Philadelphia, Pa.—The various usages of this company's resurfacing materials are presented in several new publications which have been circulated recently by the company. Photographs aid the written material in showing the application of the materials to factory floors, roofs, walls, etc.

Foxboro Co., Foxboro, Mass.—A new sixteen page folder has been issued by this firm lately. The folder contains illustrations of more than twenty instruments, representative of the entire line, and describes the seal of certification which is now attached to all the company's instruments. Separate sections discuss thermometers, pyrometers, controllers for pressure, temperature and flow; electric controllers; Stabilog controllers; pressure gauges; liquid level gauges; flow meters; flow controllers; humidity instruments and portables and tachometers.

General Electric Co., Schenectady, N. Y.—An attractive new bulletin issued recently by this company traces the manufacture of the company's pyrano capacitators by means of a series of truly fine photographs. Of particular interest are the photographs of a beater, paper machine and calender rolls; used herein to show the manufacture of a very thin kraft paper used as the solid dielectric in the capacitators. In addition to showing the complete manufacturing and testing stages the bulletin illustrates the uses of the product also. This 12x9 publication is spiral-bound, has a stiff cover and is entitled *It Pays to Be Particular.*

Haynes Stellite Co., Kokomo, Ind.—A useful booklet, listing eighteen books, reprint and folders dealing with hard-facing alloys, cutting tools and alloys for chemical processing equipment, has been issued by this company. The literature, published by Haynes Stellite, is summarized and grouped under five sections in the bulletin.

E. F. Houghton and Co., Philadelphia, Pa.—An attractive bulletin, dealing with the uses and applications of the company's "Sta-Put" lubricants, has been issued recently by this concern. Using photographs to good advantage, the publication shows how the lubricants are applied to various types of machinery and points out the grade of lubricant necessary for the best performance. The bulletin also explains how the company's lubricants are divided into series; each series covering a specific lubrication problem or a specific use of the lubricant itself.

Industrial Gloves Co., Danville, Ill.—A catalogue of safety apparel has been brought out by this firm recently. The company has listed such devices as steel-reinforced gloves, mittens, arm protectors, asbestos safeguards, welders' protective apparel, etc. The catalogue is illustrated.

International Nickel Co., Inc., New York, N. Y.—This company now has ready for distribution the interesting paper presented by their Mr. A. G. Zima at the meeting of the Pacific Section of TAPPI entitled *Nickel Alloy Steels and Cast Irons in the Pulp and Paper Industry.* The paper describes the progress achieved in the development of nickel alloy steels and cast irons, the discussion of which centers chiefly around the sulphite pulping process. The paper gives detailed consideration to a great many specific applications of metal parts as used in the paper industry. Company will supply copies on request.

Johns-Manville, New York, N. Y.—An extremely interesting publication entitled *Heat,* is a late offering of this company. Designed to be helpful and informative to the engineer, yet written in the language of the layman, this book provides a great deal of information on heat in concise, usable form. Five chapters deal with history of heat, methods of heat transfer, heat conservation, materials available for conserving heat and the specific uses of these materials. The many interesting photographs, together with the written material and diagrams, make this publication a thing of value. The booklet is a supplement to the current J-M motion picture, *Heat and Its Control.*

Metalspray Co., Inc., Los Angeles, Calif.—A new bulletin (No. 800) illustrating the use of this company's Metalspray guns and the method whereby molten metal can be sprayed on all materials, has been released lately by this concern. Featured in the bulletin is a photograph showing the application of molten metal on a beater roll. Written material and other photographs serve to give a complete picture of the apparatus and process involved.

Quigley Co., Inc., New York, N. Y.—Various types and uses of the company's acid-proof cements are described in a new bulletin now available. Photographs and testimonial letters, in addition to the written descriptive material, show the adaptability of the product. The bulletin (No. A.F. 122-R) also lists the other industrial specialties manufactured by the firm.

Reliance Electric and Engineering Co., Cleveland, Ohio—This bulletin describes the Harland sectional drive for paper machines, which is, now being sold in the United States by the Reliance firm. The Harland system is described in the bulletin by means of photographs and concisely-written literature.

Roots-Connersville Blower Corp., Connersville, Ind.—This company's automatic boiler service units are described in a recent bulletin now being circulated by the firm. Included in the bulletin are illustrations of condensate return service for gravity systems, automatic boiler make-up and condensate return and direct feed boiler supply service. Tables and diagrams, together with useful engineering data, make this bulletin a valuable reference.

Stephens-Adamson Mfg. Co., Aurora, Ill.—This company's new, large catalogue (No. 47) presents their complete line of belt conveyors, carriers, trippers, pulleys, shafts, bearings, belting and bucket elevators for handling bulk materials. The catalogue, 124 pages long and spiral-bound, gives a most complete picture of the company's products and contains extremely valuable data on the construction, design and uses of same. Each particular specialty is explained in detail by the use of photographs, drawings and tabular matter, in addition to regular reading matter. Price lists and specification tables are included in this presentation.

Stickle Steam Specialties Co., Indianapolis, Ind.—This bulletin (No. 100) describes the company's open coil feed water heaters and purifiers. Explaining first the direct economies of heating boiler feedwater, the bulletin sets forth the principle of the company's feed-water heaters, including the deaerating, non-deaerating and metering types. Written in such a manner as to be thoroughly understandable, this publication contains much of interest and value to the paper industry; an example of this being the formulae for figuring savings in the heating of boiler feed-water.

BOOKS

The Pulp and Paper Industry of the Pacific Northwest—This report, issued by the office of the Division Engineer, North Pacific Division, U. S. Engineer Department, deals with the expansion of the pulp and paper industry throughout the Pacific Northwest. The report has been prepared with the assistance of the U. S. Forest Service and the Research Department of the Portland Chamber of Commerce and contains 394 pages with 23 illustrations. It has been mimeographed in three volumes. Volume I is the main report and includes a full discussion of the industry, its present status with respect to other sections of the United States and Canada, and a study of transportation costs on newsprint and woodpulp. Volume II covers the pulpwood resources of the Columbia River area and Volume III is a comprehensive statistical study covering the industry of the United States with special references to the Northwest. Copies of the report can be obtained at the U. S. Engineer Office, 523 Pittock Block, Portland, Ore., for 75 cents per volume.

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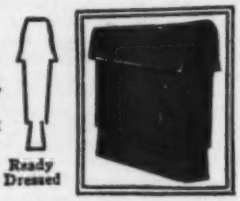

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◆ New Uses for Logging Waste

Ten million tons of annual logging waste from Washington's lumber mills may soon become the source of supply for an important new industry in the Northwest. Recent experimentation gives promise of developing processes for converting this waste into pure white pulp suitable for the manufacture of newsprint, fine papers and probably cellophane.

Pulp mills have been unable to use this material because of the excessive length and other peculiarities of Douglas fir fibre. It baffled known processes and experimenters made little progress toward a solution. In November, 1935, a WPA allotment of about $6,000 was made to finance scientific study of the problem under supervision of the University of Washington in Seattle.

Satisfactory results from experiments conducted by this project led to the installation in October, 1937, of specially designed chemical processing equipment at the miniature pulp mill of the WPA "aids to industry" project in the University's new chemistry building.

This equipment includes a pulp digester with a two-way circulating system. The cooking liquor travels continuously through this machine, effecting a double digestion of the wood fibres. A four-plate diaphragm screen, one-third the size of standard pulp mill screen, together with 17 other devices, is used in the new process which covers every operation from wood chip stage to the screened, washed and bleached product.

The test mill covers 20x40 feet of floor space. It will handle a charge of about 30 pounds of pulp and could, if desired, produce enough newsprint to supply the college daily newspaper. The cellulose division of duPont de Nemours & Co., Inc, has evidenced interest and offers to take part of the mill's output.

Chemists and technicians in charge predict the new process will be perfected within a year.

◆ Annual Meeting of National Paperboard Association

The annual meeting of the National Paperboard Association, Inc., was held at the Waldorf-Astoria Hotel, New York City, November 18, with about 86 per cent of the membership present. By a unanimous vote the present officers were re-elected for the ensuing year. The officers are: President, Henry D. Schmidt, Schmidt & Ault Paper Co., York, Pa.; vice-president, S. M. Phelan, Jr., West Virginia Pulp and Paper Co., New York, N. Y.; executive manager, Frederick G. Becker, Chicago; and secretary-treasurer, H. S. Adler, Chicago.

Executives Report on Past Activities

President Schmidt submitted a report on "Association Activities of the Past Year," in which he covered in a concise manner, the principal activities and accomplishments of the industry and the Association. Of timely interest was Mr. Schmidt's concluding statement:

"Today we have an industry in which many factors, large and small, look upon industry problems as their own problems, for each of us can only succeed with our own companies as our Industry succeeds. Instead of groups or divisions looking for petty grievances, or seeking advantages one over the other, or pulling in cross directions, we have one large group that is leading the way toward better things. It is our duty to carry forward as a united industry. If we but continue this policy, we can look forward with confidence and assurance to the days that are to come."

Following Mr. Schmidt's report, Vice-President S. M. Phelan, Jr., addressed the assemblage. In his closing plea for continued industry co-operation Mr. Phelan said: "In closing, I call upon all of us to pull together so that our team may score touchdowns rather than lose through fumbles, penalties, and being thrown for a loss, which loss may result in the stockholder-coach replacing us with substitutes who can carry the ball across the goal line."

Board Groups Make Report

After Mr. Phelan's report, the chairmen of the various board groups reported on the progress and activities of their particular sections. Those so reporting included: John W. Kieckhefer, Eastern and Western Container-Board Group; Colonel

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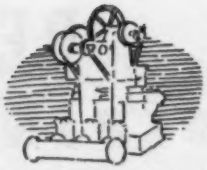

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High Density BEATERS

Hundreds of highly successful installations in service.

THE MIDWEST-FULTON MACHINE COMPANY
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Perforations that are accurate in size and alignment
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H. W. Ellerson, Southern Container-Board Group; R. W. McEwan, Eastern Boxboard Group; W. H. Beckwith, Western Boxboard Group; Alan G. Goldsmith, Corrugating Materials Group; D. H. Patterson, Jr., Pacific Coast Group; and D. H. Greene, Lightweight Chipboard and Bogus Group.

Members of the Association's staff contributed several interesting reports. These included: "Legal Departments and Outlook for New Legislation," by Malcom K. Whyte, counsel; "Stream Pollution," by C. M. Baker, engineer; "Import Matters, Tariffs and Foreign Competition," by Warren B. Bullock, manager of the Import Committee of the American Paper Industry; "Labor Relations in the Paperboard Industry," by Finley F. Bell; and a statistical report on the industry by Grafton Whiting, statistician.

◆ Michigan Superintendents and Technical Men to Hold Joint Meeting

The annual joint meeting of the Michigan Division of the American Pulp & Paper Mill Superintendents Association and the Kalamazoo Valley Section of T.A.P.P.I. will be held on Thursday, January 20th, at the Park American Hotel, Kalamazoo, at 6:30 p. m.

This meeting is the outstanding meeting of the year and serves as a paper makers' get-together, at which time the men in the mill, foremen, superintendents, technical men, and managers are in attendance. This annual affair started several years ago with the idea of establishing a closer relationship between the technical men, the superintendents and the men in the mill, and it has proved very popular and worthwhile.

The Committee in Charge of Arrangements, including Wm. Mathaway, Paul deGuehery, and Frank Whittington of the T.A.P.P.I., and Dan Stacey, Lester LaLiberte, and A. B. Perlick of the Superintendents Association, announce the following program.

Dinner—6:30 p. m.

Toastmaster—R. A. Hayward, remarks

Speaker—Robert F. Reed, Head of the Lithographic Foundation, Cincinnati, Ohio

Topic: "Lithography and Printing Paper in General"

Ray Zellers will present a talk on Employee-Employer Relations as applied to paper mills

◆ Consolidated Paper Division Qualifies for Safety Honor Roll

The Wayagamack Division of the Consolidated Paper Corporation, Limited, Montreal, Que., situated at Three Rivers, Que., has qualified for the Honor Roll of the National Safety Council by exceeding the 400,000 man-hours stipulation of immunity from a lost time injury.

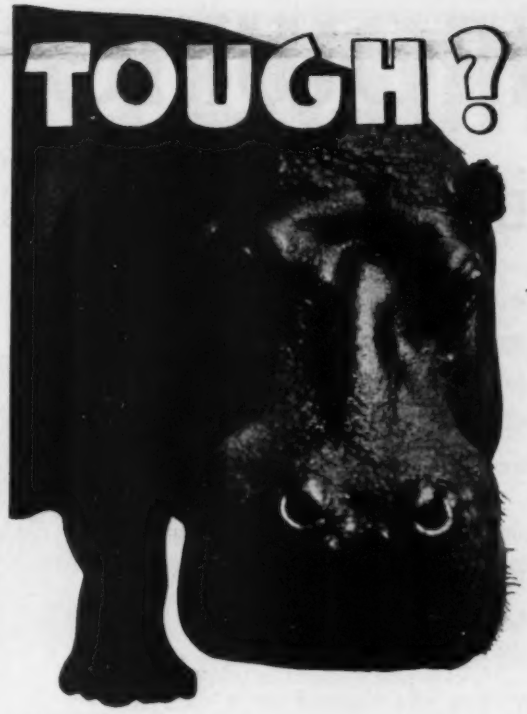
On November 1st the Division sustained an accident terminating a period of 185 consecutive days immunity from lost time injury, representing 972,188 man-hours exposure to hazard. The plant manufactures mechanical and chemical pulp kraft and newsprint and embraces practically every hazard of the industry, from the reclaiming of pulpwood from the river, woodyard and all processes of manufacture, including bleaching, to shipping of the finished products. During the period there was an average of 777 employees.

The incident "breaking" the record was a falling handled object, an air gun, which fractured a great toe of an employee of the General Mechanical Department who was *not* wearing Safety Shoes.

◆ Southern Foresters to Meet With Agricultural Workers

The Association of Southern Agricultural Workers will hold its thirty-ninth annual convention on February 2, 3, and 4, in Atlanta, Ga., with the forestry section of the organization sharing a large part of the activities.

The forestry section will have a meeting on the afternoon of February 2 which will be devoted to a symposium on recent forestry legislation as it affects the South. On Wednesday evening, February 2, there will be a dinner and a joint meeting of the five southern sections of the Society of American Foresters. Thursday morning, February 3, will be devoted to the presentation of four papers covering various phases of the pulp and paper industry in the South.



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The paper mills need the ruggedness and dependability of IXL drives—drives that will stand up under terrific paper mill punishment; where maximum power has to be delivered—continuously and smoothly—day after day!

IXL Titan single and double reduction helical gear speed reducers were designed for tough jobs—and built for tough jobs—by an organization with 77 years' experience as gear specialists. That's why these units are standard in the paper mills; and why your speed reduction problems can best be solved by IXL.

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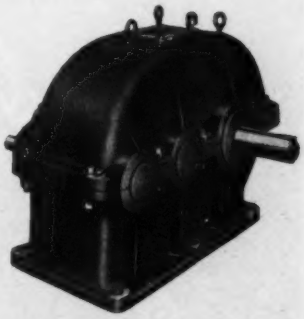

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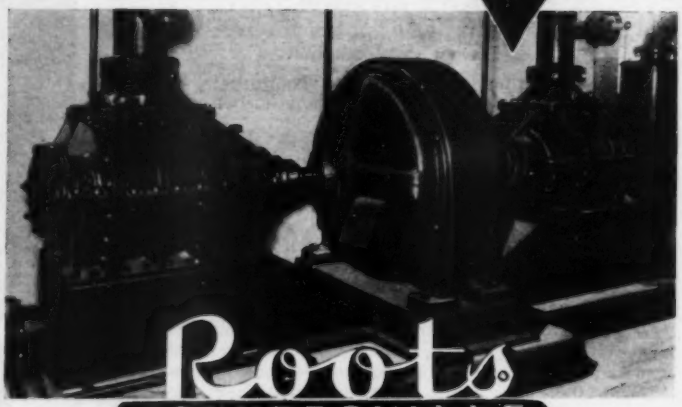

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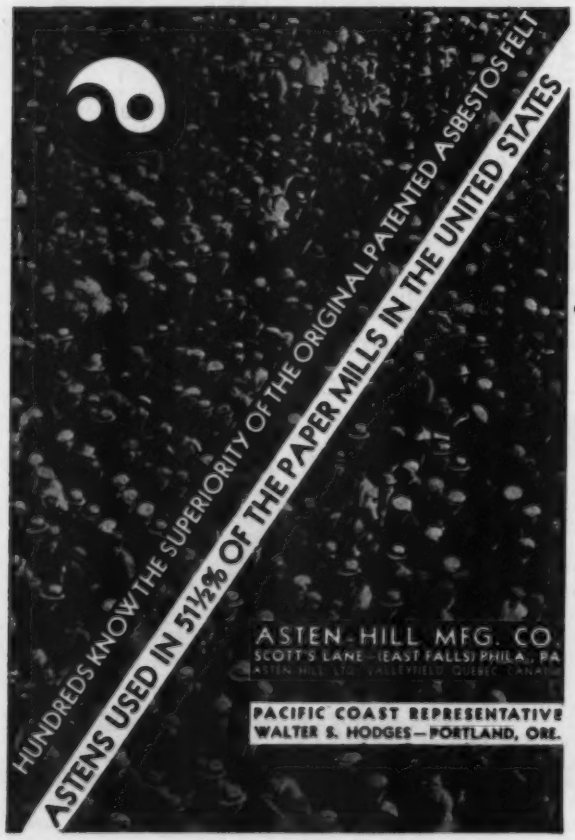
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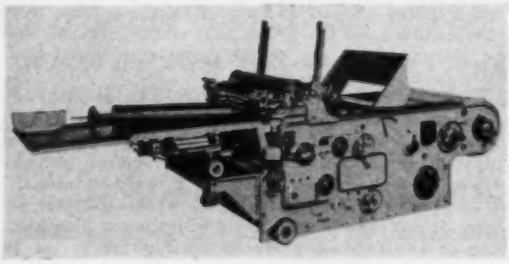

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July 1, 1937 to June 30, 1938
Cumulative Scores as of October 31
26 Mills Have Perfect Record

PERFECT SCORES
Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
A	Consolidated Paper Corp., Ltd.	Wayagamack Div.	Three Rivers, P. Q., Can.
A	Container Corp. of America	Philadelphia	Pennsylvania
B	Pioneer-Division-Flintkote Co.	Los Angeles	California
C	Strathmore Paper Co.	Woronoco	Massachusetts
C	Finch Pruyn & Co., Inc.	Glens Falls	New York
D	The Harriman Company	Harriman	Tennessee
D	Container Corp. of America	Carthage	Indiana
D	Bird & Son, Inc.	Phillipsdale	Rhode Island
D	Crown Willamette Paper Co.	Lebanon	Oregon
D	Union Bag & Paper Corp.	Allen Paper Mill	Hudson Falls, N. Y.
D	Container Corp. of America	Circleville	Ohio
D	Spaulding Fibre Co., Inc.	Milton	New Hampshire
D	United States Envelope Co.	Morgan Paper Co. Div.	Litits, Pa.
D	The Mead Corporation	Nashville	Tennessee
D	Rogers Fibre Co., Inc.	Bar Mills	Maine
D	Hollingsworth & Whitney Co.	Aroostook & Cobbossee Mills	Gardner, Maine
D	Alton Box Board Co.	Carlyle	Illinois
D	International Paper Co.	Riley No. 23	Riley, Maine
D	Spaulding Fibre Co., Inc.	Hayes Plant	North Rochester, N. H.

Division II—Paper and Board Re-Manufacturing

Union Bag & Paper Corp.	Specialty Bag Factory	Hudson Falls, N. Y.
Bird & Son, Inc.	Norwood	Massachusetts
Bird & Son, Inc.	Chicago	Illinois
Texas Corrugated Box Co., Inc.	Dallas	Texas
Bemis Bros. Bag Co.	East Pepperell	Massachusetts
Bay West Paper Co.	Green Bay	Wisconsin
Fisher Paper Box Co.	Minneapolis	Minnesota

IMPERFECT SCORES

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP A	P-108	3	1	1.019
	P-139	4	1	1.501
	P- 12	5	3	4.372
	P- 69	6	3	4.725
	P- 22	7	2	4.901
	P- 1	8	6	5.207
	P- 19	9	3	6.295
	P-121	10	4	6.392
	P- 84	11	5	7.368
	P- 18	12	7	7.569
	P- 28	13	13	7.882
	P- 30	14	4	8.217
	P-136	15	5	8.451
	P-102	16	6	9.516
	P-128	17	4	9.857
	P- 10	18	8	10.911
	P- 27	19	17	11.476
	P- 21	20	7	11.515
	P- 9	21	12	11.545
	P-107	22	6	13.999
	P- 11	23	9	14.528
	P- 62	24	12	15.331
	P- 23	25	8	16.335
	P- 2	26	8	17.861
	P- 67	27	18	18.306
	P- 73	28	21	20.479
	P- 64	29	11	20.895
	P- 40	30	17	25.785
	P-120	31	10	31.713
	P- 87	32	27	33.461
	P-114	33	30	35.179
	P- 32	34	21	39.529
	P-140	35	26	43.747
	P- 71	36	28	56.297
GROUP B	P- 68	2	1	2.547
	P- 72	3	1	3.207
	P- 4	4	1	3.310
	P-143	5	1	4.128
	P-133	6	2	5.356
	P- 59	7	2	5.962
	P-142	8	2	7.754
	P-122	9	3	8.408
	P- 97	10	3	8.848
	P- 58	11	4	10.402
	P- 60	12	4	10.409
	P- 70	13	4	11.727
	P-112	14	5	13.201
	P-119	15	4	15.080
	P- 3	16	7	17.677
	P-124	17	6	18.081
	P- 45	18	7	22.253
	P- 26	19	7	24.502
	P- 24	20	7	24.858
	P- 14	21	8	25.081
	P-123	22	9	25.636
	P-137	23	8	26.314
	P- 15	24	9	27.962
	P-130	25	12	31.723
	P- 83	26	14	35.444
	P-104	27	16	53.322
	P-100	Withdrawn—Reports Missing.		
GROUP C	P- 55	3	1	4.241
	P- 43	4	1	6.291
	P- 52	5	2	10.039
	P- 37	6	2	10.365
	P- 88	7	3	13.816
	P-103	8	2	14.818
	P-116	9	2	14.993
	P- 46	10	4	16.740
	P-113	11	3	18.556
	P- 61	12	4	19.435
	P- 33	13	4	21.388
	P- 94	14	4	28.036
	P- 14	15	4	29.981
	P- 29	16	5	33.308
	P- 17	17	5	33.343
	P- 41	18	8	36.385
	P- 47	19	6	38.350
	P- 34	20	8	45.747
	P-111	21	9	52.453
	P- 48	22	8	55.860
	P-144	23	12	67.353
	P- 80	24	12	90.413
	P- 51	Withdrawn—Reports Missing.		
GROUP D	P- 91	15	1	9.265
	P- 42	16	1	13.043
	P- 93	17	1	14.797
	P- 99	18	1	15.159
	P-125	19	1	16.512
	P- 35	20	1	17.736
	P-141	21	1	18.270
	P- 6	22	3	26.614
	P-110	23	1	30.421
	P-106	24	3	31.898
	P- 36	25	3	36.187
	P-134	26	4	39.742
	P- 63	27	4	41.961
	P- 81	28	4	48.305
	P- 7	29	5	49.338
	P- 38	30	3	54.535
	P-138	31	4	54.877
	P- 65	32	3	60.656
	P- 98	33	4	69.907
	P-131	34	5	81.788

Division II—Paper and Board Re-Manufacturing

R-23	8	1	3.034
R-28	9	1	5.195
R-27	10	1	7.454
R-19	11	1	7.733
R- 5	12	2	8.151
R-13	13	1	9.709
R-21	14	3	11.948
R-18	15	1	12.000
R-10	16	3	17.856
R-24	17	5	24.586
R-11	18	1	26.890
R-22	19	1	31.630
R- 9	20	3	31.676
R- 1	21	6	32.751
R-26	22	8	56.931
R- 4	23	2	77.782

October Report Not Included: International Paper Co., Riley, Maine; P-27; P-64; P-120; P-143; P-142; P-26; P-25; P-144; P-138; P-65; P-98; R-5; R-18; R-22.

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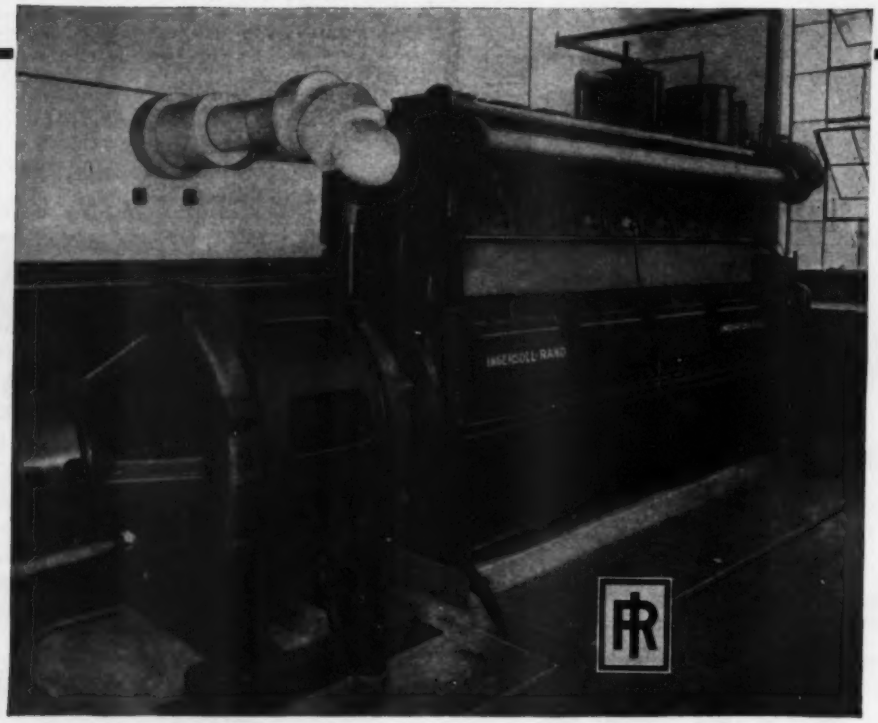
Type S Diesel Proves Economical in Paper Mill



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The Diesel engine is an 8 cylinder, 10 x 12 I-R Type S unit. It drives a 300 kw., 440 volt alternating current generator.

The Type S unit is ideal for such applications because of its high operating economy, low installation and maintenance costs and ease of operation.

Such features as force feed lubrication throughout, a fully enclosed engine, conservative rating, dynamically balanced crankshaft and an efficient cooling system insure long life and maintained operating economy.

Perhaps a Type S Diesel will help reduce your power costs. Why not ask an I-R engineer to investigate.

Reprints of an article describing the power arrangements at the Hinsdale Paper Manufacturing Co. are available on request.

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POWER

GENERATION + UTILIZATION + MAINTENANCE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worthwhile practices suggest new ideas and wider usages of equipment.

By W. S. JOULE

◆ Transfer of Heat to the Boiler

Heat is transferred by three distinct processes, radiation, conduction and convection.

(a) Radiation is the direct passage of heat energy in the form of rays through space. In a furnace, heat is radiated from the burning fuel and gases, and the portion of the heating surface which is directly over the fire receives the radiant heat from the fire and is very effective in raising steam.

(b) Conduction—Heat passes by conduction from the particles of hot gas in contact with the tubes and drums through the metal of the tubes and the drums into the particles of water on the other side.

(c) Convection is the transfer of heat by the motion of the fluid containing it. In transversing the heating surfaces of a boiler, the hot gases give up heat by convection to the metal of the tubes and drum through which it passes by conduction and starts to travel again by convection facilitated by the circulation in the boiler.

◆ Pitted Mica

Pitted mica is a term applied to a serious type of commutator trouble usually encountered in cases where the commutator has become oil soaked, due to leaking or over full bearings.

Mica readily absorbs oil. If, therefore, oil remains upon the surface of the commutator for any length of time, a certain amount of this oil will soak into the mica segments between the bars. This will result in arcing and ring fire, causing the mica to be burned away, and leaving carbonized paths sometimes 2 or 3 inches in depth. If this condition is noticed in its early stages, before the pitting has reached a depth of, say, ½ in., the commutator may be temporarily repaired by patching or filling. This may be done as follows: Cut away all of the carbonized mica carefully and remove all burnt particles with a knife or a thin hack saw blade. After having thoroughly cleaned the holes in this manner, fill them with a good commutator paste of which there are many upon the market. If none can be secured, however, a good filling paste may be made up as follows: Two parts plaster of Paris, one part powdered mica; and enough glue to make a thick paste. This, when applied will dry quickly and when kept free from oil will hold for a year or longer.

It often occurs that the mica segments have been burned by excessive sparking, such burning not necessarily having been superinduced by oil and that the pitting is confined more or less to the surface. In such cases, the trouble is readily eliminated by undercutting. This procedure, which is the same as that used to relieve the trouble known as high mica, consists in slightly grooving the mica below the surface of the commutator. The depth to which the insulation may be grooved depends upon the thickness of the mica and the voltage normally existing between adjacent bars. For usual thicknesses and with the voltage between segments ranging between 10 and 18 v., undercutting should not exceed $\frac{1}{32}$ in. It may be done with a hack saw or preferably with tools specially made for the purpose.

◆ Safeguarding Valve Operation

Many accidents have been caused by the opening or closing of a valve at an inopportune time. This makes it necessary to mark valves which must remain undisturbed during the performance of some particular work.

Under routine running conditions there is need for locks, and tags and signs warning of danger, or definitely prohibiting manipulation. When the more unusual work is being done such as repairing, cleaning of boilers, and installing of machinery, the situation is special and each case needs individual treatment. The men doing such jobs set the valves as required and it is necessary that they be left as set until the job is finished.

Safeguards may be of various kinds. Warning tags may be attached to the valve wheels or stems. Wheel covers, which usually take the form of a metal box, which is hooked or sometimes locked around the valve wheel, protect the valve against manipulation. Another method which accomplishes about the same results as the wheel covers is the removal of the valve handles. In this case it is necessary that the spindle of the valve and handle or wheel shall be arranged to make this possible. In those cases in which the inopportune opening or closing of a valve would be unusually dangerous, signals of conspicuous character are employed. This of course is similar to the tag system only that the danger element is more clearly emphasized.

In this connection, mention may be made of the necessity of safeguarding such protective and controlling devices as safety valves, relief valves, water columns and gage glasses, pump governors, alarms and the like, against being reset, blocked or otherwise tampered with by unauthorized persons. The method to be employed must be chosen to fit the case, a padlock, a seal, an upset bolt or rivet, a warning sign, depending upon the element of danger involved, the form of organization and the personnel.

◆ Size of Pipe

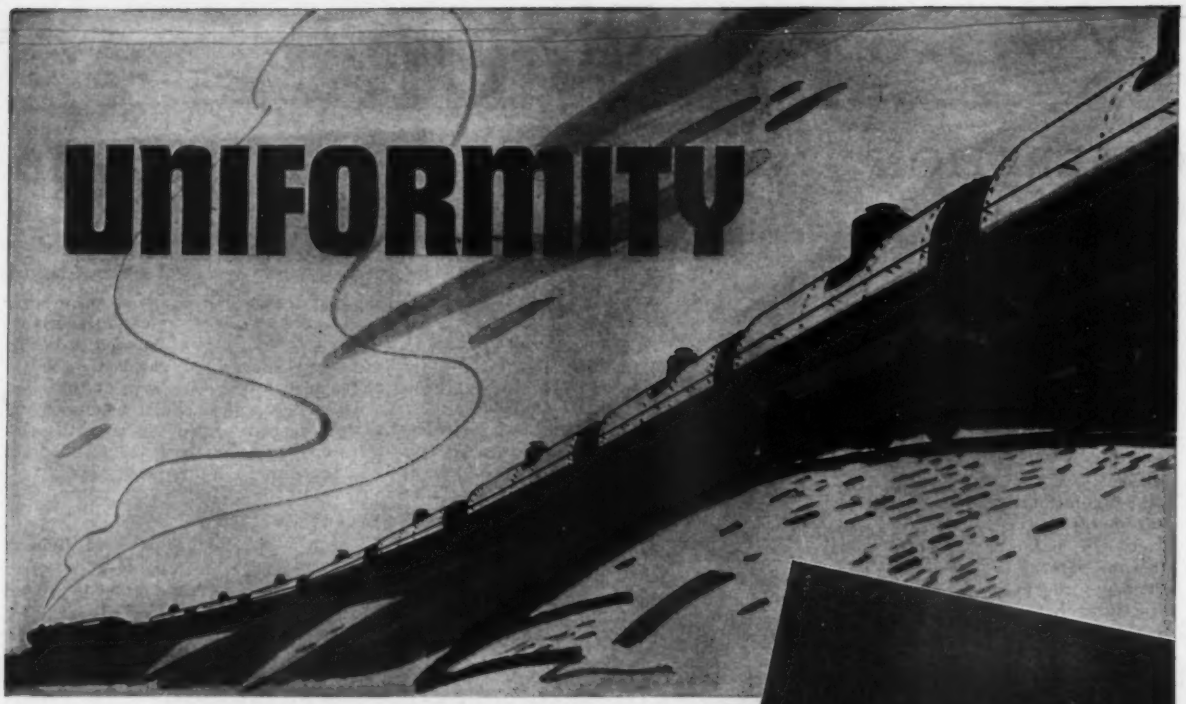
The best size of pipe is often difficult to choose; while pipe of large size reduces friction, when it is larger than necessary disadvantages result. In general, it should be said that the minimum size which can be counted upon to do the work in an economical manner is the best. The smaller the pipe, the greater the velocity, and frictional resistance to flow increases rapidly with increase of velocity. On the other hand, in the case of steam, where it is desired to maintain high temperature, a part of this friction work is not lost but operates to keep up the temperature of the steam. Small diameters mean small radiating surface, smaller fittings and less initial expense throughout.

◆ How to Etch Steel

Mixtures and a method for etching on steel by using a rubber stamp are as follows: The steel is first polished and then coated with guaiacum varnish. The rubber stamp bearing the design or lettering desired, is then coated on its face with a thin solution of caustic potash, and pressed on the varnished surface. Wherever the potash solution touches the varnish, the latter is eaten away down to the steel. The etching acid can then be applied and is free to attack the steel where the varnish is missing.

◆ Oil Piping Should Be Watched

Condition of the oil piping should be watched closely so that no obstruction is permitted to form which might reduce the oil supply to any of the turbine bearings. If the oil piping is provided with sufficient openings, it may be blown out with steam or compressed air whenever necessary; if not, the piping must be taken off and cleaned internally. If the turbine has oil-cooled type bearings, the machine is equipped with a surface oil cooler. A deposit will gradually form on the tubes of the oil cooler which will reduce its effectiveness and when the temperature of the oil leaving the cooler rises to what is considered a dangerous point, the cooler must be cut out of service and cleaned.



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TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

IN THE PAPER INDUSTRY

◆ Resin Studies on Coniferous Woods

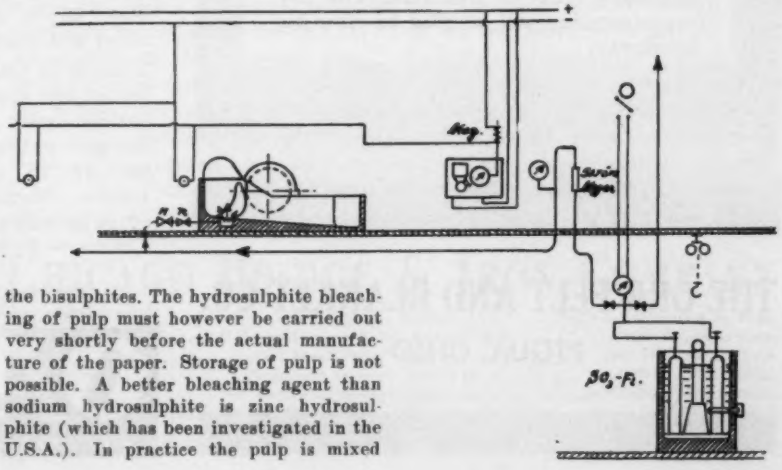
This is evidently the first of a series of studies that aim to throw more light on the variations in resin content depending on species and site of pine, on the age of the tree, and location of wood in the bole, on the influence of drying on resin content, and on the relationship of rosin content to other properties of the wood. In this article, the authors give the ether (and in some instances the alcoholic) extractives of smooth and rough bark pine wood. Ordinarily, the heartwood ranges from 15-28 per cent resin, while the sapwood ranges from 1.3 to 3.0 per cent. Usually the alcoholic heartwood extractives are nearly the same (in percentage) as the ether extractives, but in rare cases the ratio of ether soluble to alcohol soluble matter is 1 to 0.7. Data show resin differences at different heights of the bole and between various annular ring zones. Taking green heartwood, the rosin content at the foot of the tree averages 21 per cent. At a height of 0.6 meter it is about 13 per cent. At 2.3 meters it approximates 10 per cent. At 4 meters it is 5-6 per cent. At 16-21 meters, the resin content is 7-9 per cent. Data are also given on air dried wood. In general for sapwood the resin content averages 12.7 kg. per solid matter; for heartwood the average figure is 33.7 kg. R. Trendelenburg and O. Schaile, Papier-Fabr. (Tech Tl.) 35, 221-30 (1937).

◆ Spots On the Fourdrinier Wire

This is a resumé of the types of foreign materials found on the wire, their causes, and suggestions for their removal. The wire is injured not only by natural mechanical wear and tear, but also by cleansing solutions that are too drastic in their action on the metal. The spots on the wire may emanate from the fiber, the water, or the loading or sizing materials. Oil may also find its way to the wire. Irregularities in beater room practice, or in the introduction of stock from the head box may give rise to wire spots. Provided these cannot be removed by pressure washing, they are usually of physical origin. Such spots may be produced by the accumulation of resinous compounds in combination with other substances, as well as by the interaction of materials run over the wire (e.g., compounds of aluminum or lime). Differentiation should be made between spots of organic origin (such as grease, resin, rubber, cellulose, slime, etc.) and those of inorganic origin (loading materials, sand, aluminum hydroxide, etc.). Fats may originate from poorly cleaned stock. Such spots on the wire can be removed by warming with turpentine, benzine, or trichloroethylene. Hot petroleum, mixed with gasoline removes rubber originating from material trapped in the half stuff, but some of the newer non-inflammable solvents are more satisfactory. Rosin spots are removed with alkali solutions applied with metal brushes having very fine wires. These resin flecks make their appearance as small pale colored deposits, which may also be removed by turps. Alumina or lime deposits form glassy deposits that can be readily identified. These may (in the case of aluminum hydroxide) be dissolved by treatment with 10 per cent sulphuric acid or 5 per cent NaOH (followed in the latter case by very dilute acid). In the case of lime, dilute, HCl is used for the removal of spots. Needless to say, care must be taken since repeated use of hydrochloric acid causes wire corrosion. In summer, slime formation is indicated by brown or gray discolorations, together with a fetid odor due to algae or bacterial action. This slime is removed by treatment with soda and care is then taken to insure inhibition of further growth in the pulp itself. M. Marini. Le Papier 40-143 (1937).

◆ Bleaching Groundwood Pulp

The author has made a critical evaluation of recent bleaching methods especially various modifications of the use of sodium bisulphite. Hydro-sulphites however have proved more satisfactory in recent practice. The sodium bisulphite equipment is expensive, and the time factor is of importance. Hydrosulphites evidently cause very rapid bleaching, and mechanical pulp is whitened prior to its introduction into the beater or mixer. Hydrosulphites also cause a very slight change in pH, an added advantage over the bisulphites. The hydrosulphite bleaching of pulp must however be carried out very shortly before the actual manufacture of the paper. Storage of pulp is not possible. A better bleaching agent than sodium hydrosulphite is zinc hydrosulphite (which has been investigated in the U.S.A.). In practice the pulp is mixed with metallic zinc powder, containing 90 per cent zinc, in the beater. A few tenths of one percent of zinc is used based on the air-dry pulp. A sulphurous acid solution (containing 35-55 grams SO_2 per liter) is then run in, in amounts that will insure 1 mol of SO_2 for each 1.1 atom of zinc. The reaction is complete in 5-10 minutes, after the introduction of the gas. When liquid SO_2 is used, the bleaching operation with zinc hydrosulphite is shown in the figure below. Here the rate of flow is measured by using a time clock and a flowmeter (Strommesser) and the cylinders are kept under thermostatic control at 25 deg. C. The introduction of the gas into the beater is through valves (A) and (R) and through the medium of an acid-proof bronze chamber built into the beater, below the bottom of the tub. In this case, after the weighing of the zinc powder, the operation becomes automatic. However when SO_2 is manufactured in the plant (for making sulphite liquor), a relatively cheap installation permits its use for bleaching mechanical pulp. K. Meltzer. Papier-Fabr. 35, (Tech Teil) 297-301 (1937).



◆ The Development of Pulp Strength Testing

This is a comprehensive article which compares methods for pulp testing now in use in England, U. S. A., Sweden, Finland, Norway and Germany. The types of disintegration, stock density, degree of beating, hydration methods, sheet formation and equipment, sheet drying, etc. are discussed and the results tabulated. While the paper contains nothing essentially new, it gives a good resumé graphical data, and 20 recent references. G. Jayme. Papier-Fabr. 35 (Tech Tl.) 193-7 (1937).

2 plus 2 = 4

Simple arithmetic

Another easy problem to solve is that of choosing the correct felting. The answer, as proved by comparative tests in many mills, is Orr.

Reasons for that answer are two-fold. Orr has a complete line of highest quality felting. Orr has the ability to grasp your water extraction problem and select the particular felt required to solve it.

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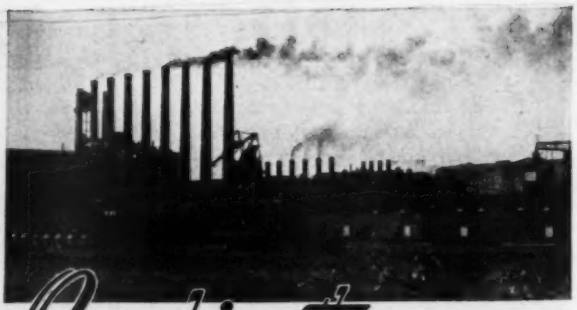

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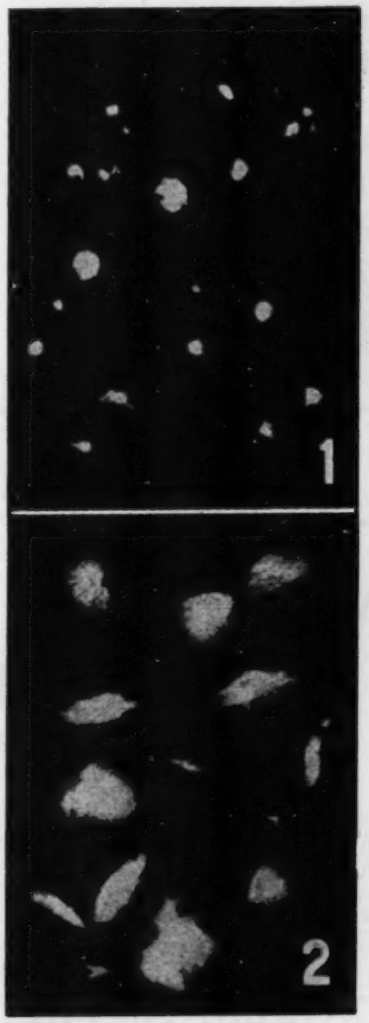
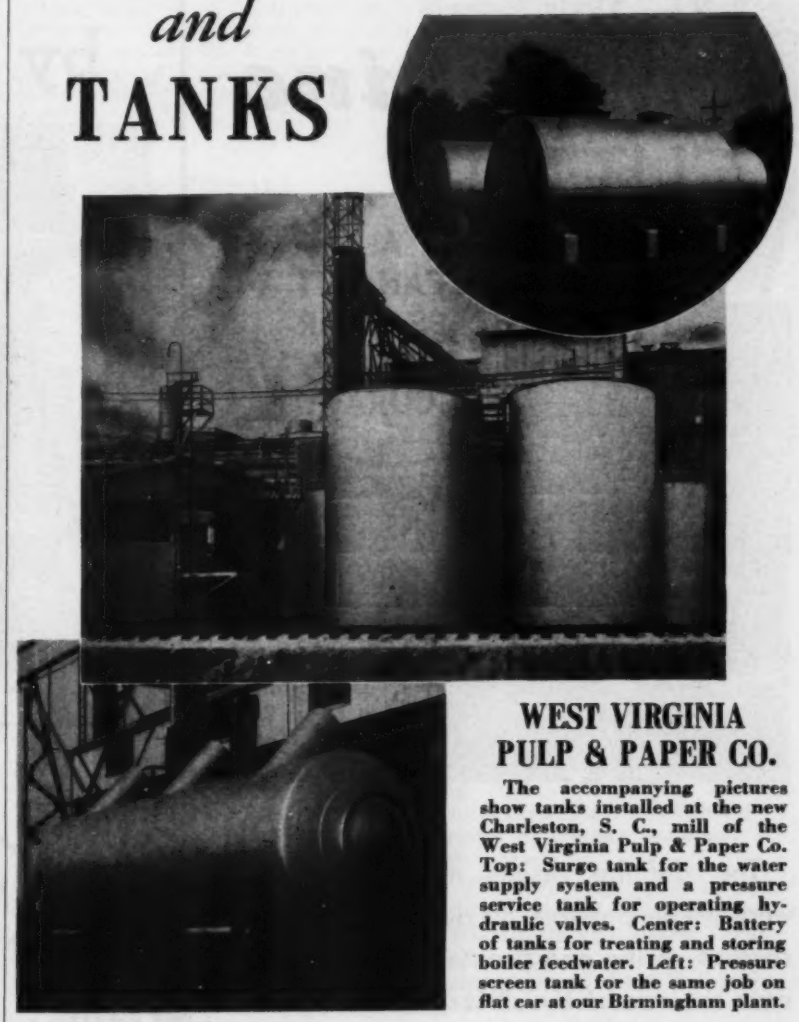
◆ Comprehensive Study of Kollergang Treatment

Another thorough investigation carried out at the Institute for Paper-Manufacture at the technical school at Darmstadt, with edgerunners, the effects of which on the finished pulp and paper have hitherto been very little understood. Two stages are involved in the action of Kollergang. The stock is at first reduced to coarse material, and then subsequently defibrated. Both stages appear to depend very largely on the consistency of the stock (i.e. on the dry weight of pulp present) and not so much on the quantity of the charge. Time and power factors are improved when a relatively low dry content is used, and the complete separation into fibers



was not feasible when the dry weight of pulp in the suspension was over 27 per cent. At a higher consistency, so-called stuff-knots (shown in Figure 1) were obtained. These are *quite definitely* different from undisintegrated portions of the pulp or paper sheet (shown in Figure 2). These knots are formed irrespective of the type of pulp or kollergang used, and with high consistencies this knotting process also increased with the time of treatment. The

STEEL PLATEWORK *and* TANKS



WEST VIRGINIA PULP & PAPER CO.

The accompanying pictures show tanks installed at the new Charleston, S. C., mill of the West Virginia Pulp & Paper Co. Top: Surge tank for the water supply system and a pressure service tank for operating hydraulic valves. Center: Battery of tanks for treating and storing boiler feedwater. Left: Pressure screen tank for the same job on flat car at our Birmingham plant.

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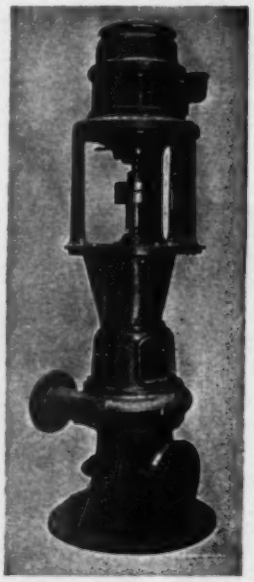

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author has shown this in the case of a paper (Bank-post papier, weight 85 g/sq. meter) and a hand bleached sulphite, giving his results in tridimensional graphs in which the number of knots is plotted against time and also against dry content of the stock. A commercial kollergang (Betriebs-kollergang) was used as well as a laboratory model (Versuchs-Kollergang). These are shown in Figure 3. (In the one case the scale is 1:30, in the other 1:15). The properties of pulps subjected to kollergang treatment have also been investigated. The general opinion in the literature (which is briefly reviewed) is that the finished sheet is better after kol-

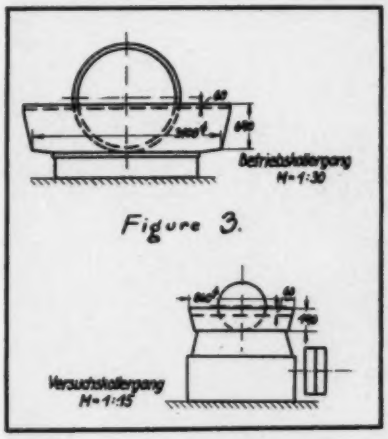

Figure 3.

lerganging. However such a generalization is hardly possible. The freeness of the pulp is not materially impaired, but the folding endurance and breaking lengths very definitely decrease after passing through the edgerunner. The stretching qualities of the sheet increased very materially and the resistance to through-tearing increased slightly. These conclusions are drawn with reservations, since they apply only to the properties of machine-finished, calendered sulphite writing papers and to hard bleached sulphite pulps. The dewatering of the pulps and papers was determined by use of the Gartshore wetness tester. (Proc. Tech. Section 1935, P.M. Ass'n, Great Britain and Ireland, Vol. XVI, Oct. 1935, Part 1,119.) The author gives numerous literature references, and 21 graphs and illustrations. Walter Brecht, Papier-Fabr. 35, No. 27 (Fest u Auslandsheft, 1937) 259-70; No. 33,313-20 (1937).

◆ Catalysts in Pulp Bleaching

This is a report of the work carried out by Larin and Nagorskji. Manganese dioxide (pyrolusite) when used as catalyst decreases the time of bleaching by about 50 per cent. The same charge of catalyst may be used over again. Ferric oxide from pyrites burners also acts as catalyst. However, its activity soon decreases and the bleaching is uneven. Furthermore, unlike manganese dioxide, the iron salts are removed from pulp with difficulty. A disadvantage of catalytic bleaching is that the copper number is increased and the alphacellulose content is decreased. The total chlorine consumption, however, is lower in the presence of catalysts than in ordinary bleaching. To summarize:—the catalyst saves time and chlorine, but yields an inferior pulp. A. Krüger. Pappers Trävarutid Finland. 19,216 (1937) through Papier-Fabr. 35 (Abstracts) 136 (1937).

◆ Porosity of Paper and Nitrocelluloses

The author defines various porous systems, in which the size of the pores, or openings, the structure of these openings, the arrangement of the system, and the actual volume occupied by the openings are fully considered. The systems are schematically illustrated and treated mathematically, with methods for computing the mean width of the pores. A technique is described for determining water penetration, with the apparatus shown in Figure 1. This has 3 parts: (1) a funnel shaped portion; (2) a pipette container with a special siphoning pipette, and (3) a Witt suction chamber. In (1) is fastened the membrane to be examined. It is adapted from a filtration device (G.A.9) manufactured by the Membranfilter-Gesellschafft of Göttingen. The outflow tube of this funnel is connected with a tube (that is bent at a slight angle—see Figure 1) by means of a standard ground-in glass joint. The pipette container is a tube 40 cm. long and 6 cm. wide, the upper end of which is fitted with a rubber stopper through which passes the tube leading from the funnel. A constriction in the upper part of the pipette container holds the pipette itself, and keeps it from slipping. The bent side arm of the long tube (2) leads to a manometer. The pipette has an upper funnel-shaped portion and is provided with an overflow siphoning device, leading directly to a container within the Witt suction chamber. A set of interchangeable pipettes (2, 10 and 50 cc. capacities) are provided, and the use of a pipette of a certain volume is predetermined by the rate of flow.

Prior to the actual measurement, the ground-in-glass sleeve leading from (1) is twisted at such an angle that water passing through the membrane flows past the outer surface of the pipette without entering it. The funnel (1) is then filled to a certain mark with filtered water, and a suitable definite pressure is applied by suction, through the use of a three-way stop-cock and a waterpump. Only when this pressure becomes constant is the ground-in glass sleeve so turned that the overflow actually enters the funnel-shaped pipette. At the instant that the water meniscus passes a lower graduated mark on the pipette, a stop watch is put in operation, and the time is recorded that elapses before an upper graduation mark is reached. This shows the outflow of a definite volume in a given time, and is termed —t seconds. A further outflow brings the outlet siphon into operation, and during the emptying process the sleeve is again turned outwards. When the

A little care -a BIG saving

In far too many plants, pipe is pipe, just as "pigs is pigs"—in other words, pipe signifies traditional, heavy-walled, wrought-steel pipe. In the installation illustrated above, for instance, heavy pipe would undoubtedly have been used in many mills, and as a matter of fact it probably would have been satisfactory from a service standpoint, but—

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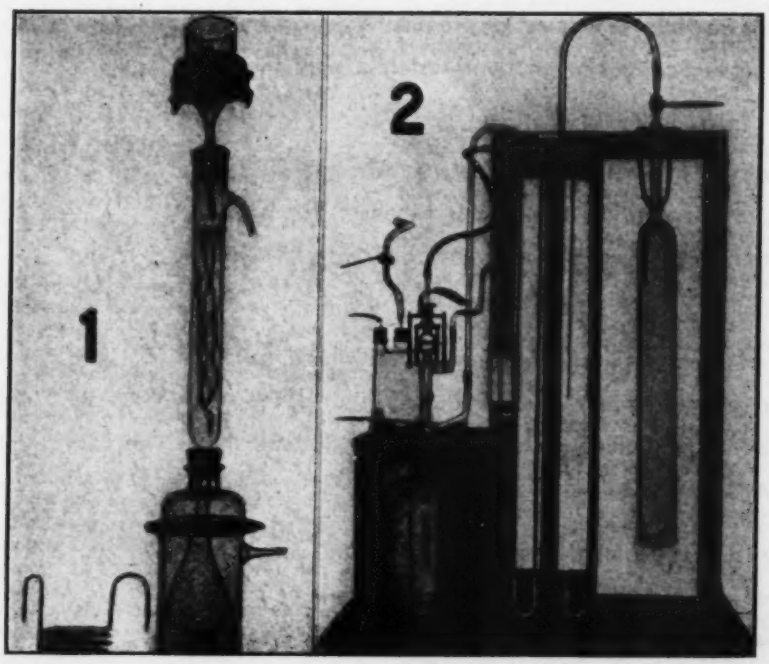
pipette is empty, a duplicate determination may be made without delay. As an example: with a membrane area of 43.6 sq. cm., a 50 cc. pipette, and an operating pressure difference of (p_e minus p_a) mm. Hg, the water permeability may be calculated as $D = 50/43.6t\ (p_e - p_a)$ 13.6. Special measuring pipettes are used with difficultly permeable membranes. These are fully described. So also is the technique for determining the permeability towards carbon tetrachloride.

The method for determining gas penetrability through a membrane depends on the use of a gas darcymeter (shown in Figure 2). This technique and computations are more fully described in Kolloid Zeitschrift 78,129 (1937). In it the membrane under observation rests (covered with a rubber ring, the opening in which has the area F) between two thick-walled glass chambers, which are then securely clamped together, and each of which carries a ground-in glass joint connected with glass tubes. The gas outlet chamber is connected with a water vacuum pump, and with the outlet manometer registering p_a. The gas inlet chamber leads to the inlet manometer registering p_e and also to the actual measuring chamber at the extreme right of the figure, which records the volume (V) of the gas under atmospheric pressure (p). This measuring



chamber is a calibrated open tube about 60 cm. long, the diameter of which depends on the type of membrane examined. The upper curved end of the chamber is connected with a three-way stop cock that permits it to be in contact either with the gas inlet chamber or with the outer air. This measuring chamber is washed out with a soap solution. Just prior to the test, when air or gas passes through the membrane under constant (reduced pressure) the lower end of the calibrated measuring chamber is sealed with a thin (stabilized) soap film, and this film then travels upwards within the chamber.

The time elapsing during the migration of the film between two graduated marks on the wall of the chamber, is recorded by a stop watch. The paper cited above gives the method of calculating gas penetration. The work of Carson with paper sheets (Bureau of Standards Research Papers, 12,567,587 [1934], in which a more complicated darcymeter was used, are discussed, as being of major importance. Carson's results, however, furnish no means of determining pore radii, or the number of pores in a sheet—only porosity and thickness, which are inversely proportional to each other. The importance of Carson's work rests on his findings that paper membranes behave as canal-like or frame-like structures, and not like reticular porous structures (i. e., networks). In their experiments the authors used nitrocellulose membrane filters. These showed no swelling in carbon tetrachloride, although water always caused a very slight swelling. In the case of paper sheets, water caused a very marked swelling, which reached constancy after an immersion of two days. Just how sizing, loading and impregnating materials affect the specific gravity of the paper substance was not explored by the present authors. However, the work of Klemm on the volume of a definite per cent of certain fillers in 100 g. paper is referred to. (Cf. Wochbl. Papierfabr. 1930, No. 1.)

The thickness of the sheet or the membrane plus the total pore volume furnish adequate fundamental data for quantitative calculations. They have more significance than the generally used formulae of "grams per tansverse-meter thickness." Extensive tabulated results are given showing the actual and specific permeability of different membranes for air, carbon tetrachloride, and water. Ordinarily, the two latter values are in fairly close agreement with each other, and are roughly 1/6 of the values obtained for air penetration, calculated for the same sample. A gas mask filter was also examined for air-permeability. The results of these various investigations are discussed in the light of the structural quality of the membrane or of the paper examined. The structure of the paper membrane is best visualized as a mixture of pores and fissure-like canals, in which the relative number of pores becomes greater, the denser the membrane. Erich Manegold and Karl Solf (Institut Kolloidschemie, Dresden). Papier-Fabr. 35 (Tech Teil) 321-7, 329-36 (1937).

◆ Food Yeasts from Sulphite Waste Liquor

After the removal of the excess of sulphur dioxide from sulphite waste liquors, by partial neutralization and by blowing through air, a special yeast was added which produced 10 liters of alcohol from the sugars contained in one cubic meter of liquid. Despite inert matter in the liquor it was still found useful in the production of yeast. The following nutrients were added:—diammonium phosphate, ammonium sulphate, magnesium sulphate and potassium sulphate, lime and chalk (the latter serving to neutralize the liquor. During the fermentation, dilute ammonia was also added. The yeast used in the culture was torula utilis and the growth continued for 8 hours (during which period the acid formed was in the main neutralized by ammonia and soda additions, while the temperature was maintained at 28-30 deg. C.). This procedure permitted the culture of food yeast from the waste liquors together with a very satisfactory production of alcohol from the carbohydrates present in the original liquor. Assuming that German pulp mills produce 5 million cubic meters of waste liquor per annum, approximately 50,000 tons of dry yeast substance (corresponding to 200,000 tons of pressed yeast) containing about 26,4000 tons of yeast protein may be produced. The drainage water from mechanical pulp mills was shown to be impractical as a culture medium since it averages only about 150 grams of reducing sugar per cubic meter. No definite conclusions were drawn regarding yeast production from steamed mechanical pulp liquors. Hermann Fink and Richard Lechner. Angewandte Chemie, 49,795 (1936) through Papier-Fabr. 35 (Abstracts) 122-3 (1937).

◆ Formyl Cellulose

The authors by using four different analytical methods, which give results ranging from 37.6 to 41.5% formyl, have demonstrated that cellulose formate contains two formyl groups for each 6 carbon atoms. Y. Uyeda and S. Nakamura. Cellulose Industry (Japan) 12,41-2 (1936) through Papier-Fabr. 35, No. 27. (Abstracts) 95 (1937).

Dependability

TWENTY-FOUR HOUR per day operation of paper mills makes it necessary to have dependable equipment. Sturdiness of design is one of the most important if not the most important individual factor in the successful application of any otherwise well designed machine.

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PAPERMAKING PATENTS

IN THE UNITED STATES

Inquiries with reference to any of these patents should be addressed to James Atkins, Munsey Building, Washington, D. C.

Compiled by James Atkins, Registered Patent Attorney

20,533—Screen Plate for Paper Making Machines. Frank Dustan, Rochester, N. Y., assignor to William A. Hardy & Sons Co., Fitchburg, Mass., a corporation of Massachusetts. Original No. 2,015,141, dated September 24, 1935, Serial No. 746,688, October 3, 1934. Application for reissue February 24, 1937, Serial No. 127,531. 8 Claims. (Cl. 92—30.) As an article of manufacture, a screen plate for the purpose described, comprising a pair of side sills, a pair of end pieces, a plurality of sections of sheet metal, each provided with two flat downwardly extending right-angle flanges arranged transverse to the long dimensions of the screen plate, said sheet metal sections and flanges extending transversely across the side sills above the same and secured thereto, the outer surfaces of the flanges of adjacent sections abutting each other whereby the tops of said sections form a continuous and substantially unbroken flat surface, and reinforcing means located beneath both ends of each section and comprising a solid body of metal filling the space beneath the sheet metal section between said flanges thereof and between the edges of the side sill, said sections being unobstructed therebeneath between the side sills except for said flanges.

2,089,898 — Production of Corrugated Cardboard. Felix Käppler, Freiberg-in-Saxony, Germany. Application August 14, 1935, Serial No. 36,205. In Germany August 17, 1934. 1 Claim. (Cl. 154—30.) A device for carrying out the method described, comprising a pair of helically milled heatable embossing rollers and a plain roller cooperating with said pair of rollers for pressing the web of material to be embossed, prior to embossing, against one of the embossing rollers and guiding the web for continuous operation without permitting deflection thereof.

2,090,002—Sized Paper. Gerald Haywood, Westernport, Md., assignor, by mesne assignments, to West Virginia Pulp & Paper Company, New York, N. Y., a corportion of Delaware. No Drawing. Application July 9, 1934, Serial No. 734,432. 5 Claims. (Cl. 91—68.) A smooth, bright book paper sheet having good ink receptivity formed from fibrous stock containing calcium sulfite as a filler to the extent of between 10 and 40% of the weight of the sheet and sizing ingredients, all thoroughly intermixed, and having a surface size consisting essentially of one or more of the class consisting of starch, glue and casein applied to at least one face thereof, said sized surface being calendered.

2,090,077—Apparatus for Testing Materials. Carl Busch Thorne, Hawkesbury, Ontario, Canada. Application February 7, 1936, Serial No. 62,797. 4 Claims. (Cl. 73—51.) Apparatus for testing the amount of fibres contained in the waste water of pulp mills comprising a rotary perforated cylinder adapted to remove coarse particles from said waste water, a separating device adapted to receive the waste water from said perforated cylinder and to remove the fibres therefrom, a rotary screen cylinder adapted to thicken said fibres, weighing means adapted continuously to receive fibres from said screen cylinder and successively to weigh predetermined quantities of said fibres and means for continuously recording the weights of said quantities.

2,090,084—Manufacture of Wallboard. Curry Ora Walper, Hamilton, Ontario, Canada. Application June 1, 1935, Serial No. 24,461. 1 Claim. (Cl. 154—2.) In the manufacture of wallboard having a quick-setting core and enclosing paper liners adhering thereto the method which comprises forming a square edge board between squeeze rolls and thereafter while the core is in plastic condition forming a taper on the longitudinal margins of the board and maintaining the taper until the core hardens.

2,090,131—Apparatus for Conditioning Paper. Lydia B. Koch, New York, N. Y. Application December 8, 1934, Serial No. 756,571. 2 Claims. (Cl. 34—19.) An apparatus for conditioning paper as characterized comprising means for dehydrating air, means for controlling temperature of air introduced to the dehydrating means, manually operated means for controlling the flow of the dehydrated air, means for controlling humidity of the air after leaving the dehydrating means, and means for controlling temperature of the air after being dehydrated.

2,091,513—Method of Digesting Cellulosic Material. Albert D. Merrill, Watertown, N. Y. Application February 14, 1935, Serial No. 6,568. 26 Claims. (Cl. 92—11). A process of digesting fibrous material which comprises forcing acid from a storage vessel into a digestion vessel by means of a steam injector, recirculating the liquor to and from the digestor with the injector and then recirculating the acid by means of a pump when the temperature of the acid has been raised to a predetermined degree.

2,091,572—Paper Manufacture. Joseph H. Swan, III, Middletown, Ohio, assignor to The Gardner-Richardson Company, Middletown, Ohio, a corporation of Ohio. Application February 15, 1934, Serial No. 711,301. 1 Claim. (Cl. 91—18). In a coating apparatus for applying a coating of predetermined characteristics to a traveling sheet of paper, the combination of application means, and smoothing means comprising a roll engaging the coated surface of the paper and rotating in a direction opposite to the travel of the paper, a brush following the roll for brushing the coated sheet, and a second roll for thereafter engaging the sheet and rotating in a direction opposite to the travel of the paper.

2,091,805—Paper Making Method and Machine. Harry A. Chuse, Madison, Wis. Application October 6, 1934, Serial No. 747,175. 9 Claims. (Cl. 92—38). A paper making machine comprising a wet section on which the paper sheet is made in the wet state, drying equipment to which the wet sheet is delivered from said wet section, said drying equipment comprising a series of drying rolls around which the sheet is carried, certain of said rolls being perforated suction drying rolls having associated means for continuously forcing heated air through substantially the entire area of the sheet entrained on said perforated rolls and the other rolls being heated drying rolls, a press through which the sheet passes after delivery from said drying equipment, and further drying equipment through which the sheet passes after pressing. In paper drying apparatus, a series of driers comprising ordinary driers and suction driers, a housing containing the same, said housing having a warm air inlet, steam coils in said housing for heating the air therein, said coils being arranged in proximity to the suction driers, and coacting felts for carrying the paper sheet successively around said driers.

2,092,140—Resilient Stretchable Fabric. William Wallace Rowe, Cincinnati, Ohio, assignor to The Paper Service Company, Lockland, Ohio, a corporation of Ohio. Application April 26, 1933, Serial No. 668,105. 8 Claims. (Cl. 154—55). A web of creped fabric having a high resident stretchability and coated upon one side with a thermoplastic adhesive substance and a layer of rubbery substance in combination with said web, said layer of rubbery substance contacting said web upon the side opposite the coating of thermoplastic adhesive substance.

2,093,337—Manufacture of Sized Papers. Oscar F. Neitzke, Belmont, Mass., assignor to Bennett Incorporated, Cambridge, Mass., a corporation of Massachusetts. No Drawing. Application March 23, 1935. Serial No. 12,731. 14 Claims. (Cl. 92—21). In the manufacture of sized paper products wherein substantially involatile, thermoplastic, pyrogenous residue, obtained from the distillation of the liquid resin separated from spent alkaline pulping liquor resulting from the pulping of pinewood, appears as a sizing ingredient, those steps which comprise intimately commingling such residue in molten condition with an alkaline aqueous liquor to effect an emul-

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sification of such residue, incorporating the resulting emulsion into papermaking stock, and forming paper from the stock.

2,093,347—Means for Applying Dope to Paper. Chester E. Beecher, De Pere, Wis. Application July 18, 1935, Serial No. 32,121. 3 Claims. (Cl. 91—50). In the art of paper making, a dope applying mechanism adapted to be disposed in a paper making machine between the presser rolls and dryer rolls, comprising a pair of rolls extending transversely of the machine, a dope receptacle having one of said pair of rolls extending thereinto, the other of the pair of rolls lying above and contacting the first roll, the said other roll contacting the underside of the paper web passing through the paper machine, and means for establishing an even distribution of dope over the periphery of the upper one of the pair of rolls comprising supporting bearings for the lower one of the pair of rolls which are independently shiftable in a plane perpendicular to the vertical.

2,093,738—Sensitized Blue Print Paper and Coating Therefor. Alger P. Reynolds, North Beverly, Mass., assignor to Spaulding-Moss Company, Boston, Mass., a corporation of Massachusetts. No Drawing. Application February 25, 1936, Serial No. 65,661. 10 Claims. (Cl. 95—7.) A sensitized blue print paper coating containing an alkaline hydrolyzable alkali metal compound, a light-sensitive iron salt in the ferric state and an alkali metal ferrocyanide, the proportions of said alkali metal compound to the other ingredients of the coating being such that a water solution of said coating has a pH value of less than 7 but not sufficiently low to permit the formation of an insoluble blue compound prior to exposure to light. A sensitized blue print paper coating containing an alkali metal hydroxide, a light-sensitive iron salt in the ferric state and an alkali metal ferrocyanide, the proportions of said alkali metal hydroxide to the other ingredients of the coating being such that a water solution of said coating has a pH value of less than 7 but not sufficiently low to permit the formation of an insoluble blue compound prior to exposure to light.

2,094,038—Steam Drier System. Alfred G. Kernin, Mosinee, Wis., assignor to Mosinee Paper Mills Company, Mosinee, Wis., a corporation of Wisconsin. Application August 24, 1936, Serial No. 97,617. 2 Claims. (Cl. 34—48.) In a steam drier system having a plurality of steam driers, means for supplying steam thereto and conduits for the removal of condensate and steam therefrom, a branched structure in each of said conduits having an orificed member in said structure having an orifice of reduced dimensions for controlling the flow of condensate and steam therethrough, a valve ahead of and a valve beyond said orifice in branches of said structure and a removeable closure member in said structure opposite said orificed member to facilitate the removal and insertion of such orificed member.

2,094,415—Paper Pleating Machine. Fred Schwartz, Green Bay, Wis., assignor to Fort Howard Paper Company, Green Bay, Wis., a corporation of Wisconsin. Application May 6, 1935, Serial No. 20,064. 3 Claims. (Cl. 154—30.) In a machine of the class described, in combination: means to deform a moving sheet of paper into longitudinally extending rounded corrugations; upper and lower opposed sets of pleating members at the opposite sides of the path of said moving sheet; each of said members comprising a block set edgewise to said path and the edges thereof each convex at the paper entering end of the sets; said edges progressively flattening to plane surfaced edges at the delivery end thereof and progressively widening to portions projecting beyond the side surfaces of the members providing overlapping shoulders upon the opposed members of the sets; said shoulders on each set spaced from the opposed shoulders a distance substantially equal to the thickness of the sheet, and means to press the resulting pleats.

2,094,454—Tri-Tab for Rolls of Web Material. Jesse F. Keville, Port Edwards, Wis., assignor to Nekoosa-Edwards Paper Company, Port Edwards, Wis., a corporation of Wisconsin. Application February 10, 1936, Serial No. 63,141. 3 Claims. (Cl. 206—59.) A finished roll of paper having a generally triangularly shaped pull-tab positioned inside of the outer layer of paper with an apex thereof extending beyond the end of said paper to facilitate grasping thereof, said tab and outer layer of paper being adhesively joined along a strip spaced from said apex and said outer layer being adhesively secured to the paper layer next below at the edge portions adjacent said tab edges.

2,095,199—Apparatus for Ornamenting Paper or the Like. James Speed, Longmeadow, Mass., assignor to Strathmore Paper Company, West Springfield, Mass., a corporation of Massachusetts. Application April 16, 1936, Serial No. 74,711. 6 Claims. (Cl. 101—32.) In apparatus for ornamenting or finishing paper or the like comprising, a relatively rigid support and a relatively yieldable body on said support having an imprinting fabric member vulcanized to the surface thereof so as to have portions thereof embedded therein and other portions extend above the plane of said yieldable body.

2,095,378—Apparatus for the Manufacture of Paper. Edgar Alexander Charlton, New York, N. Y., assignor to International Paper Company, New York, N. Y., a corporation of New York. Application December 17, 1934, Serial No. 757,764. 2 Claims. (Cl. 92—45.) In an apparatus of the class described, a paper making wire, a roll positioned beneath said wire and provided with spaced openings, members removably secured in said openings and projecting beyond the periphery of said roll into contact with said wire and means for rotating said roll at a different rate than the rate of travel of said wire.

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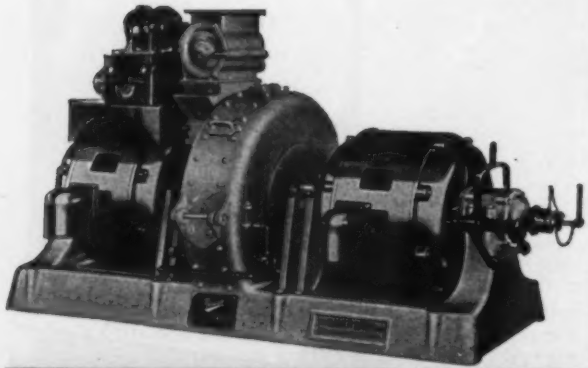

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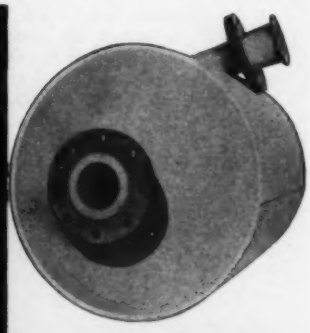

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The COMMERCIAL OUTLOOK

New York, December 1, 1937.

THE market for paper and paperboard is quiet indeed. Aside from routine absorption of supplies, and mostly against contracts, there is a surprising lack of activity in the market. Paper buyers, along with buyers of nearly all other commodities, are on strike. All appear to be concentrating on a single objective; namely, to reduce inventories to as low a level as feasible prior to the ending of the year and the stock-taking period. Purchases are held down to the proverbial bone; in numerous cases they are virtually nil, insofar as the acquisition of supplies currently is concerned.

Obviously, paper and board manufacturing is greatly affected, and adversely of course, by this policy existing among buyers. Mills which only a comparatively short while ago were running at maximum capacity are now operating but two or three days weekly. On all sides throughout the industry are evidences of production curtailment. Manufacturers, unwilling to turn out any paper or board for which they haven't definite orders, are exerting every effort to limit their output to the actual requirements of the market.

Nevertheless, there are signs of improving sentiment within the industry. The fact that stocks have been undoubtedly substantially decreased during the last few weeks of exceedingly stringent buying prompts manufacturers to expect at least some expansion of demand soon after the turn of the year. There is the realization that the Federal Government is making a sincere effort to better business and industry; it is felt generally there is no fundamental reason for the present distinct lull in business, and reassurances from the large majority of trade authorities, economists and industrialists that the prevailing situation is nothing more than a cycle of recession rather than of depression are gradually, though seemingly surely, bringing about a more confident viewpoint regarding business prospects. The opinion is growing that industry will snap out of the present dilemna earlier and faster than was believed a few weeks ago.

Mills representing about 67 per cent of the Canadian total print paper production have confirmed the price of $50 per ton for newsprint delivered in the New York and Chicago areas for the first six months of 1938, it is pointed out in a summary from the Newsprint Association of Canada. Seven of the largest Canadian and United States producers, representing over 60 per cent of the Canadian-United States industry, or about 3,250,000 tons in newsprint output have made known the $50 price for the first half of the new year. The Great Northern Company, representing about 300,000 tons, will charge $48 delivered New York. The inference is left to be drawn that the weight of price determination is with the group announcing $50 for the first half of 1938.

The newest development in the newsprint price situation is announcement by the International Paper Company, quickly followed by other leading companies, that no change from the $50 basis will be made during the latter half of next year; in short, that the $50 base price for delivery at Chicago, New York and other Atlantic and Gulf ports promulgated for the first six months of 1938 is accordingly extended to include the entire year.

Showing the effects of the recently initiated curtailment program on production, newsprint output in Canada during October increased only 4.5 per cent over the same month of 1936, compared with a gain of 16.8 per cent for the first ten months of 1937. In both the United States and Newfoundland, output was lower than a year ago, so that the entire North American production in October rose only 2.1 per cent above October, 1936. However, October's output in Canada was the greatest for any October on record and only slightly below the peak of 318,713 tons set by Canadian mills in August, 1937.

Canadian mills produced 314,594 tons of newsprint in October, against 301,106 tons in the same 1936 month, while United States mills produced 78,352 tons, against 81,027 tons and Newfoundland mills 28,638 tons, against 30,677 tons. Total North American output was 421,584 tons, compared with 412,810 tons in October, 1936. Canadian production in the first ten months of 1937 amounted to 3,042,970 tons contrasted with 2,604,831 tons in the same 1936 period, a rise of 16.8 per cent. United States output in ten months was 785,301 tons, against 760,416 tons in 1936, a gain of 3.3 per cent. Newfoundland produced 297,861 tons, against 272,162 tons in 1936, an increase of 9.4 per cent. Total North American newsprint production in the ten-month period was 4,126,132 tons, a rise of 488,723 tons or 13.4 per cent above 3,637,409 tons in the corresponding 1936 period.

Shipments of newsprint during October ran slightly ahead of output in that month, so that stocks at mills at the end of the month were reduced to 109,009 tons, compared with 111,026 tons a month previously, and 75,998 tons on October 31, 1936.

Production of paperboard in the United States in September reached a total of 348,091 tons, which although below the preceding month's output of 365,287 tons, was well above the 328,519 tons produced in the same 1936 month. The September production of board brought the aggregate for the first nine months of 1937 up to 3,442,266 tons, constituting an increase of 793,641 tons, or 29.9 per cent, over the total of 2,648,625 tons manufactured in the corresponding time of 1936, and a rise of 1,031,691 tons, or 42.7 per cent, above the 2,410,575 tons produced in the first nine months of 1935, according to the U. S. Census Bureau's monthly summary.

Board output was at 71.5 per cent of mills' rated capacity in September, against 75.7 per cent in the month preceding and 79.1 per cent in the same 1936 month. New orders received by mills during September called for a total of 324,216 tons of board, against 348,685 tons in the month before and 353,197 tons in September, 1936. Unfilled orders held by mills at the end of September called for 108,467 tons, compared with 129,745 tons a month earlier and 135,732 tons a year before.

Shipments of prepared roofing from mills in the United States in September amounted to 3,368,391 squares, contrasted with 2,671,158 squares in the month preceding and 4,257,980 squares in the similar 1936 month, according to Census Bureau figures. Shipments during the first nine months of 1937 totaled 23,716,207 squares, against 24,188,282 squares in the corresponding 1936 period, and 19,903,105 squares in 1935.

◆ ◆

◆ Ohio TAPPI-Miami Supers Hold Joint Conference

A joint meeting of the Ohio section of TAPPI and the Miami Valley division of the American Pulp and Paper Mill Superintendents Association, was held November 6, at Middletown, Ohio.

Charles Pippert, of the Shartle Brothers Machine Co., was the first speaker on the program followed by President Vincent Waters of TAPPI who turned the meeting over to James R. Simpson, president of the Miami Valley division of the Superintendents Association. Mr. Simpson outlined his program for the remainder of the year and Mr. Waters then introduced the Johns-Manville representatives who presented the J-M film, "Heat and Its Control." K. Ivar Ekholm, of the National Aniline and Chemical Co., spoke on "Paper Making Colors and Color Problems."

◆ Pacific TAPPI Sees New "Color" Film

An interesting meeting of the Pacific section of TAPPI was held November 9 at Port Angeles, Wash., when a motion picture dealing with color dyes was shown the assemblage. The film was presented by A. M. Mears of the Pacific Coast Supply Co., who gave a brief talk on "The Physics of Color." In addition to this presentation, George de Marais, of the General Dyestuff Corp., spoke on "The Psychology of Color," followed by Bruce Hoffman, senior forester of the U. S. Forest Service, who emphasized the importance of the pulp and paper industry in the Pacific Northwest.

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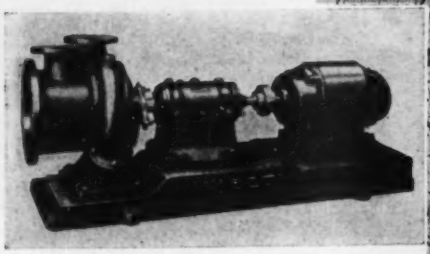

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Domestic RAW MATERIALS

◆ Papermaking Rags

Paper and board manufacturers are nearly completely out of evidence as purchasers of raw material. Not in a long while, perhaps not even during the deep depression days of 1932 or 1933, have markets been quite so inactive. Despite sharp recessions in prices in most classes of raw material consumed by paper mills, demand in almost every instance is practically at a standstill, dealers and importers reporting that, irrespective of the efforts they may pursue, they have little or no success in interesting consuming customers in offerings. Apparently, manufacturers are bent on reducing inventories of raw material to as low a level as feasible prior to the close of the year and the stock-taking period, and consequently are holding current purchases down to the proverbial bone.

Papermaking rags are under neglect of buyers. There is almost no demand for any class of rag stock, notwithstanding that dealers, in their eagerness to *effect* sales, are willing to accept substantially lower prices for most grades. Despite the market dullness, there are signs of increasing resistance arising to any further recession, probably due to dealers and packers feeling that the decline has gone far enough and that it avails them nothing anyway to press to sell with mill customers in their present mood. Certainly, this is the case as regards roofing or the lowest class of rags for papermaking.

The decline in roofing stock prices during the last several months has been sharp, approximately 50 per cent. Now dealers are not showing so much anxiety to effect sales; firstly, because they cannot hope to break even on such stocks of roofing rags as they may have in hand and accumulated some time ago, and secondly, because they can note a tightening up of the supply situation based on the unusually low prices prevailing for waste paper, rag stock and other waste materials and the customary falling off of collections under such circumstances. Moreover, the belief is that if the Government's efforts to stimulate construction activities, and more especially home-building, meet with any degree of success the demand for roofing felt will increase appreciably and roofing rags should stage a quick and broad comeback.

Domestic roofing rags are quoted in the East at 80 cents per hundred pounds for No. 2 stock f.o.b. dealers' shipping points, and 1.10 cents per pound for No. 1 classification roofing. There is little buying at these, or, for that matter, at any prices, but felt manufacturers in some instances are evincing a little more interest. Foreign roofing rags are nominally 1.55 cents a pound for dark colored cottons and 1.95 cents for linsey garments ex dock New York or other American Atlantic ports.

Dealers in the New York area seek to obtain somewhere in the vicinity of 7.50 cents a pound f.o.b. shipping points for No. 1 new white shirt cuttings, 5.50 cents for new light silesias, 6.75 cents for blue overall cuttings, 7.50 cents for soft unbleached muslins, 3.15 cents for fancy shirt cuttings, 6 cents for light flannelettes, 7.25 cents for bleached canton flannels, 4 cents for black silesias, 11 cents for white linen cuttings and 10 cents for grey linen cuttings, but prices of new cuttings are in general nominal and it is probable that fine paper mills could buy in some cases at below these mentioned quotations.

◆ Rope and Bagging

Demand from paper mills for old rope and scrap bagging is next to nil. Prices are gradually drifting downward, the situation being entirely in favor of buyers, and it is a difficult matter to determine what the bottom levels of the market really are. Dealers as a rule ask 3 cents a pound for domestic No. 1 old manila rope f.o.b. shipping points and this same price, or close to it, for foreign rope ex dock American Atlantic ports. Old strings have tumbled in price to approximately 2 cents a pound at shipping points for soft jute, 1.75 cents for sisal and 60 cents a hundred pounds for mixed strings. Scrap burlap bagging of paper mill quality is around 1.75 cents a pound at dealers' points, and gunny bagging 2.10 cents per pound. Imported bagging, however, is quoted above these levels.

◆ Old Paper

The waste paper market is in a demoralized condition, at any rate as concerns the low or bulky grades. With board mills—the principal consumers—practically entirely out of the picture as buyers for the present while having sizable stocks on hand and striving to reduce these inventories, prices have sunk to the lowest levels known in a long time. As a matter of fact, mixed paper has been disposed of in some distress cases at virtually nothing in the East, where a price basis of 12½ cents per hundred pounds is nominally ruling for No. 1 mixed f.o.b. New York. Folded newspapers are down to 15 cents a hundred pounds for so-called ordinary packing, though packers are asking and receiving 25 cents for special packing of news. Old corrugated boxes have moved off in price to 25 cents a hundred pounds at shipping points in the East. Higher grades also are sharply lower. Hard white shavings of No. 1 ordinary grade are available at 2 cents a pound, soft white shavings at 1.60 cents, No. 1 hard white envelope cuttings at 2.30 cents, old No. 1 kraft paper at 65 cents a hundred, white ledgers at 90 cents, colored ledgers at 75 cents and heavy No. 1 books and magazines at 55 cents. So serious is the market situation in the East that it is said packers are hauling mixed paper to incinerators for burning; also, they are exerting every influence for the curtailment of collections, believing that the only solution of the present difficult problem is a sharp reduction in available supplies.

◆ Pulpwood

There is less demand for pulpwood in the open market, but supplies are reported moving against contracts. No definite changes are noted in ruling quotations, though the tendency in prices is altogether in favor of buyers.

◆ Mechanical Pulp

Favorable water conditions, coupled with an almost complete absence of open-market demand for supplies, make for an easy tone in mechanical pulp, and while manufacturers are endeavoring to sustain quotations as best they can under the circumstances, there has been some sagging of prices. Another bearish feature is that imported groundwood is offered in some cases at prices representing a considerable reduction from replacement costs abroad, with buyers hard to find. Domestic and Canadian prime moist groundwood is around $35 per ton delivered at consuming points in northern United States, depending on the haul from producing centers or about 25 or $26 f.o.b. pulp mills in Canada.

◆ Chemical Pulp

Demand for wood pulp is virtually at a standstill. Consumers appear far more concerned with reducing stocks than with augmenting them, and only in exceptional instances are they operating to any extent whatever as buyers in the market. Domestic pulp is affected to an equal degree with foreign pulp. In the recent past there have been seemingly more sellers among consumers than buyers, by which is meant more papermakers have been in evidence offering surplus lots of pulp for resale than those showing any disposition to purchase. Contract quotations for domestic pulp for the first quarter of 1938 have not, at this writing, been announced, but there is reason to believe prices prevailing during the current fourth quarter of 1937 will be maintained for January-March next. There have been reports of southern kraft pulp being available at 2.25 cents a pound delivered northern consuming points, and perhaps at below this price. Prices of pulp are mainly nominal in the prevailing uncertain market, other than contract bases.

◆ Chemicals

Casein quotations have receded to 12 50 to 13 cents per pound for the domestic standard ground and 14 cents for finely ground. Bleaching powder is quotably maintained at 2 to 2.25 cents a pound in drums at works. Soda ash holds to a basis of 1.05 cents a pound in bags f.o.b. works.

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Import and Export MARKETS

IMPORTS

◆ Paper

Imports of paper and paper manufactures into the United States in September reached a total value of $12,382,878, according to official U. S. Department of Commerce figures, comparing with $11,033,239 in the month preceding and $9,764,236 in the similar month last year. The September importations brought the aggregate for the first nine months of the current year up to a value of $99,962,539, against $78,847,937 during the corresponding nine-month period a year ago.

Newsprint imports in September amounted in value to $11,218,648, making a total for the first nine months of this year of $88,994,353, contrasted with arrivals valued at $68,780,272 in the same time of 1936. Imports of cigarette paper during the first nine months of the current year were valued at $2,894,605, against $2,983,276 in the similar period a year ago, while imports of kraft wrapping paper were valued at $1,011,246 in the nine months, compared with $1,151,533 last year in the same time.

◆ Wood Pulp

While it can hardly be said that wood wood pulp has weakened definitely in foreign primary production sources, it is certainly true that a softer undertone prevails in the market. This is doubtless due to the continued dearth of demand from American consuming quarters, as well to perhaps a quieting of demand from other consuming countries. The market in the United States is distressingly quiet. There is almost no demand at all emanating from consuming sources. To make the situation even worse, numerous consumers of pulp are intimating that they expect to cancel contracts for pulp they have ordered for shipment from abroad during 1938, and some have filed definite notices of cancellations. When the very strong pulp situation of a few months ago is recalled, it does not seem possible that the complexion of the market could change so radically in such a comparatively short time.

Paper and board manufacturers are not only in no mood to purchase pulp, but many are seeking to dispose of surplus supplies which they bought some while ago and which they now are eager to get rid of. These resale offerings are of course at recessions in price, compared with current replacement costs abroad, some at fairly sharp reductions. Nevertheless, buyers are extremely difficult to locate, and the great preponderance of sellers over buyers now in evidence is undermining market values to a very perceptible degree. Whether pulp prices are headed for much lower levels is something yet to be ascertained. Producers in Europe are doing what they can to sustain the market and are not by any means exerting pressure to effect sales here while apparently being well sold up for an appreciable period ahead, but there is no denying that the trend of the market is sharply downward.

Imports of chemical wood pulp into the United States during September fell below the arrivals in the several previous months, yet continued on a fairly large scale. A total of 187,241 short tons, air dry weight, valued at $8,434,951 was imported in September, compared with 201,019 short tons of a value of $8,873,086 in the preceding month and 186,558 tons valued at $6,989,193 in the same 1936 month, according to U. S. Commerce Department figures. The September imports brought the total for the first nine months of the current year up to 1,664,625 short tons of chemical pulp, contrasted with 1,500,715 tons in the similar period of last year. Thus, pulp imports this year are running substantially in excess of last year's receipts. Mechanical pulp imports in September were 15,300 short tons valued at $308,380, against 15,504 tons of a value of $326,194 in the month before and 25,163 tons of a value of $432,094 in September, 1936. Nine-months imports this year totaled 165,449 tons, as against 159,085 tons in the corresponding period a year ago,

◆ Paper Stock

Reflecting the quieter market situation, importations of papermaking rags into the United States in September were sharply lower than in the same month last year. Total rag imports this year have fallen behind receipts last year in the similar period, insofar as volume is concerned, though the total value of this year's imports exceeds that of a year ago. The September arrivals amounted to 15,151,471 pounds, valued at $285,014, against 22,959,133 pounds of a declared value of $452,665 in the same 1936 month, while total receipts in the first nine months of this year were 198,189,977 pounds of a value of $3,632,528, contrasted with 224,202,440 pounds valued at $3,616,952 in the corresponding nine-month period last year.

On the other hand, imports of miscellaneous paper stock, comprising old rope, scrap bagging, waste paper, etc., have recorded increases in both volume and value this year over a year ago, amounting to 8,081,910 pounds of a value of $169,123 in September last, and 93,655,691 pounds for a value of $2,217,789 during the first nine months of this year, against 77,775,116 pounds valued at $1,323,995 in the similar nine months of 1936.

September imports of all paper base stocks, including wood pulp and pulpwood, declined almost 9 per cent compared with the preceding month, falling from a total of $11,731,403 to $10,738,593. However, this was still almost 15 per cent over the same month in 1936.

EXPORTS

◆ Exports

Exports of paper and paper products from the United States during September reached a value of $2,441,824, according to U. S. Department of Commerce official statistics. This was an increase of 6 per cent over the August imports and 77 per cent above the September, 1936, arrivals. Most of the increase over the preceding month was in greaseproof and waterproof papers, which rose about 30 per cent, while overissue and old newspapers gained 16 per cent. Although boxboard, which was the second largest item by volume in August, declined 50 per cent in September, this was offset by a gain of 50 per cent in kraft paper, 48 per cent increase in tissue and crepe paper, 28 per cent in fibre and insulating board, while paper boxes and cartons rose to 1,388,319 pounds, a gain of almost 80 per cent.

While exports of newsprint declined 40 per cent from August, this still represented a gain of about 18 per cent over the same 1936 month. Uncoated book paper showed a similar gain over last year with a 69 per cent increase. Kraft paper exports represented the largest percentage gain over September, 1936, increasing 250 per cent. Of the 35 items reported, while only 16 showed percentage gains over the preceding month, these represented the largest volume of exports. Only 10 items showed a decline as compared with the similar month last year.

Exports of newsprint paper during the first nine months of this year reached a total value of $751,374, against $486,854 in the same time of 1936; uncoated book paper, $1,384,781, against $655,365; greaseproof and waterproof paper, $1,326,608, against $1,165,990; kraft wrapping paper, $1,704,860, against $1,503,348; tissue and crepe paper, $649,816, against $450,377; toilet paper, $737,856, against $514,931; overissue and old newspapers, $1,671,335, against $730,896; boxboard, $1,160,215, against $929,705; other paperboard, $1,190,948, against $780,731; writing paper, $2,423,810, against $1,555,360; sheathing and building paper, $377,969, against $232,880; paper bags, $893,212, against $557,963, and boxes and cartons, $638,630, against $543,156.

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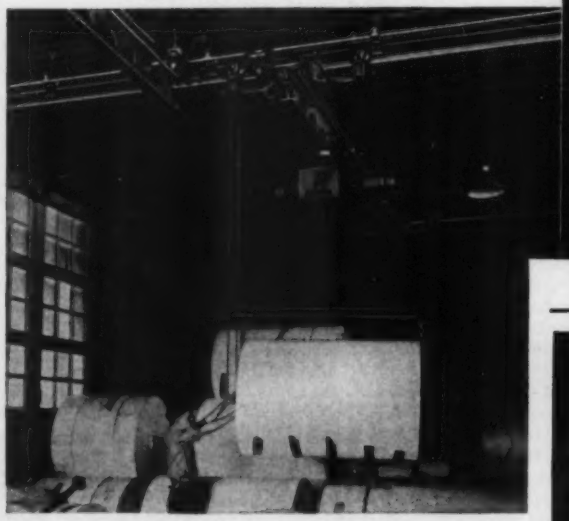

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